

CIRCULATING COPY

Please Return Promptly

Volume 4 Number 26
\$2.95

December 24, 1985

Accelerate Your
PC for \$25

What's New
In FORTRAN?

The Best and Worst in
Spelling Checkers

PC Lab Tests 24 Plotters

- How Fast?
- How Sharp?
- How Much?

HP
7550

HP
DMP-51

Epson
HI-80

Nicolet
eta 8



Tecmar turns multifunction into MegaFunction™!

Multifunction is multifunction. But how about a full-feature 384K card **plus** nearly one megabyte of non-volatile RAM disk at the same low multifunction board price! That's Tecmar's MegaFunction™ — big enough to store your favorite software like Lotus 1-2-3™ and Wordstar™ on a single board, and run them at hard disk speed.

A Big Head Start. No more waiting to boot from your floppy. No more waiting to load Lotus 1-2-3. No more waiting to switch from Lotus to Wordstar. And a dramatic decrease in time required to search large files or documents. All because MegaFunction's non-volatile RAM disk eliminates time wasted accessing hard disks or floppies.

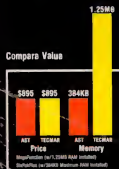
A Long Memory. MegaFunction's memory just won't quit. An external power supply is included to keep your work safely in non-volatile RAM — which means your programs won't disappear when you turn off your computer. So you're ready to run again with the flick of a switch! And if you want even more memory, add the optional daughter board to increase RAM capacity to 3.25 megabytes.



Compare Us To The Competition!

Features	Tecmar MegaFunction	AST SoftpakPlus™
Main Board RAM Maximum	1.25MB	384KB
Daughter Board RAM Maximum	2.00MB	Not Available
Maximum RAM	3.25MB	384KB
Serial Port	Standard	Standard
Parallel Port	Standard	Standard
Clock/Calendar w/Standby Battery	Standard	Standard
Supports IBM PC, PC XT, & Compatibles	Standard	Standard
ROM Boot from Electronic Disk	Standard	Not Available
Board Memory Volatility	Non-Volatile	Volatile
External Board Power Supply	Standard	Not Available
Data Transfers	DMA (Fast)	Not Available
Price	\$895	\$995

A Really Big Deal. We didn't forget all the other reasons for buying a multifunction board for your IBM PC, XT, or compatible. Like a clock/calendar including built-in standby battery power. A parallel port for the printer you need. And the FREE bonus of one of the most popular multifunction software packages — Tecmar's Treasure Chest™ of Software, including programs for an electronic address book, calculator, and calendar.



Save Big Bucks. MegaFunction gives you the speed of a hard disk at the price of a multifunction board. Which means you get full functionality and a RAM disk for the same price as the leading add-on card. Check our features against the competition — then call us at (216) 349-1009 for the location of the dealer nearest you.

Why settle for multifunction when you can have MegaFunction — megabytes PLUS multifunction!



Copyright 1985, Tecmar, Inc.
AST SoftpakPlus is a trademark of AST Research.
Lotus 1-2-3 is a trademark of Lotus Development Corporation.
Wordstar is a trademark of Micropro International Corporation.

TECMAR
The Power Behind Your PC

6225 Cochran Road, Solon, Ohio 44139
Phone: (216) 349-1009 Telex: 466692



“What do we mean by *honest* accounting software?”

We mean software that does what it says it will do; it works in the real world.

What does RealWorld™ accounting software do?

Our fully integrated accounting line offers General Ledger, Accounts Receivable, Payroll, Accounts Payable, Order Entry, Inventory Control and Sales Analysis as honest solutions to your accounting problems. Our software runs on most popular micro-computers.

RealWorld software has been designed to suit your business accounting needs. Our software is built on the actual live feedback collected from our dealers and users over the last ten years.

An installed base of over 80,000 satisfied users has kept us in touch with the true needs of business accounting in the real world. An independent survey of computer retailers rated us #1 in technical performance, documentation, user friendliness, features and adaptability.

See for yourself what RealWorld can do

Seeing is believing—go to your local computer dealer and get a live demonstration of our software. You can enter real data about your real life accounting problems and see the results for yourself.

Insist on the accounting software that does what it says it will do. RealWorld is available at most major computer stores, or call us direct for the number of the dealer nearest you. Or send us the coupon below and we will mail the information to you without delay.



RealWorld Corporation
Dover Road
Chichester, N.H. 03263

1-603-225-9565

RealWorld is a trademark of RealWorld Corporation

I'd like more information about the Accounting Software that does what it says it will do and the name, address and phone # of the computer store nearest me that has RealWorld Accounting Software.

Name
Company
Address
City State
Zip Code Phone #
Hardware
Type of Business

TCS**TEXAS COMPUTER SYSTEMS**Toll Free **1-800-433-5184** Texas 214 264-8511

Mail Order Computing Since 1980 • D & B Rated • Major corporate PO's accepted.

Heart of Texas Computer Systems, Inc.
P.O. Box 531198
Grand Prairie, Texas 75053Now
with 18 Month
Hard Drive Warranty

Hard Disk Systems

FREE with each Kit: the powerful Windows Utility Software
which includes a Head Parking feature. \$50 value. See ad on next page.

PC, XT, & compatibles	AT compatibles	CMI 18 month warranty	Seagate 15 month warranty
10 Meg \$379	20 Meg \$595	\$649	
20 Meg \$479	30 Meg \$749	\$799	

Kits include drive, controller, cables,
hardware, & easy instructions. Systems
are individually tested and backed by our
warranty of 12 or more months.For combo floppy/hard drive
controller, add \$75.All AT drives have fast 20ms access time
All kits include rails, cables & instructions
All drives use controllers in computer.
Quote from Hard Disk.

Streaming Tape BACKUPS

INTERNAL

10 Meg	Excess Space	\$399
20 Meg	Excess or Generic Cartridge	\$699
23 Meg	MicroSystems Cartridge	\$699
60 Meg	Excess or Generic Cartridge	\$888

EXTERNAL

20 Meg	Excess or Generic Cartridge	\$749
25 Meg	MicroSystems Cartridge	\$849
60 Meg	Excess or Generic Cartridge	\$1095

MT25 \$849



25 Megabyte Tape Back-up

- Uses no slots on PCs, XTs. Just plugs in external floppy controller connector
- Adjustable - Back-up several PCs by simply moving back-up and plugging in
- Quickly saves/restores whole volumes or individual files
- Uses popular DC600A cartridge, giving unlimited storage capacity
- Has 6 month warranty

AT Controller Card **\$129**
Only needed for AT computer

We offer lowest prices on PRINTERS

FUJITSU DotMax 9 180 cps rear tractor, NLQ mode	\$349
FUJITSU DotMax 24 24 pins 288 cps, rear tractor, True LQ	\$1495
PANASONIC 1091 120 cps	\$258
PANASONIC 1092 180 cps	\$366
PANASONIC 1093 15 in carriage	\$436
PANASONIC 3151 15 in CW	\$412
JUKI 6000 Dotmatrix 10 cps	\$199
JUKI 6100 Dotmatrix 18 cps	\$359
JUKI 6300 15 in 40 cps	\$679
JUKI 2200 Typewriter/Printer	\$299
STAR (Gemini) SG-16 120 cps	\$225
STAR (Gemini) SG-15 15 in	\$375
STAR (Radix) SR-15 200 cps	Call
OLYMPIA RO Dotmatrix	\$269
OLYMPIA NP 180 cps, rear track	\$279

Call for quantity prices!
We can't be beat!

Emergency Power Systems

Don't take chances
on power failure killing
your important data.

- Self contained battery
- Auto recharging
- Instant activation
- Plugs in standard outlet

200 watt (10 min)	\$269
200 watt (35 min)	\$299
425 watt	\$449
1000 watt	\$899

Power Supplies

For added power
when upgrading your PC

\$89	\$119
135 watt	150 watt

Quantity discounts available!

Internal Modem \$225

300-1200 Baud, Hayes compatible
for PC, XT, AT. Includes software.

ANCHOR MODEMS	
Express	\$275
300-1200 Baud, 100% Hayes	
Mark 12	\$219
300-1200 Baud, Hayes compatible	
Volkmodem 12	\$179
300-1200 Baud, Hayes compatible	
Volkmodem	\$69
300 Baud, full 100 compatible	

Floppy Drives for Apple IIe, IIc • Plug in and run **\$149**

TRANSFER SWITCHES

Double up
your
equipment

2 position	\$75
2X switch	\$108

Other configurations available

• \$100 minimum purchase required.

- All merchandise is new, with manufacturer's warranty.
- We accept cashier's checks, money orders, VISA, MC, C.O.D. and approved corporate PO's. For American Express, add 3%.

Brand names used are registered trademarks. We are not. Returns for model defects authorization
number. Prices, specifications and availability are subject to price or change without notice.

Maxell Corp. of America, 60 Oxford Drive, Moonachie, NJ 07074

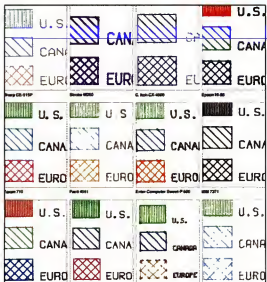


maxell

FLOPPY DISKS
THE GOLD STANDARD
CIRCLE 230 ON READER



FEATURES



COVER STORY

Adding a Touch of Color:

24 Plotters, \$399 to \$5,950 108

Glenn Hart/No longer satisfied with hard-copy output of simple text, PC users are, in ever-increasing numbers, looking for ways to get high-quality graphics onto paper. Here, *PC Magazine* tests 24 plotters, covering the market from the low end up into the rarefied strata of the high-priced, professional units. We run *PC Magazine Labs* benchmark tests on each and give you easy-reference print samples as well as charts of features and test results, so you can find a plotter to meet your needs at a price you can afford.

HARDWARE

Genoa and Paradise: A Superset of Graphics Standards

Winn L. Rosch/Getting high quality in text and graphics from an all-IBM display can cost you dollars and expansion slots. Genoa Systems and Paradise Systems have some alternatives.



COLUMNS/DEPARTMENTS

WHAT'S INSIDE

A behind-the-scenes look at the making of *PC Magazine*.

PC NEWS

Nine pages of up-to-the-minute news, product minireviews, interviews, short features, and commentary.

FROM THE EDITOR'S SCREEN

Loose Ends

Bill Machrone/This is the time of year when most people give some serious thought to their list of gripes, wishes, and unfinished business. Here, according to editor Bill Machrone, are some of the biggest issues the computer industry will have to tackle in the new year.

LETTERS TO PC MAGAZINE

Our readers respond.

THE NORTON CHRONICLES

Tracking Down Lost Data

Peter Norton/If you are lucky, you can find accidentally erased data simply by looking for it in the most likely place. Often, however, the search is considerably more complicated.

QUANTUM LEAP

On the Threshold of Supercheap RAM

Ron Jeffries/Technological and economic factors will produce a huge leap in the amount of memory that the average PC will come with.

COMPUTERS IN SOCIETY

'Tis the Season to Be Floppy

Stephen Manes/PC Magazine's master of tongue-in-cheek makes out a slightly cynical Christmas-gift wish list.

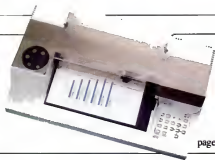
PROGRAMMING/UTILITIES

KEY-FAKEing Keystrokes

Charles Petzold/KEY-FAKE extends the usefulness of your batch files by letting you supply initial program configuration commands automatically.

SPREADSHEET CLINIC

Jared Taylor/Macros for date-stamping files, wiping out unwanted error messages, speeding up @SUMs, recalculating cell values, and more.



page 108



Turbocharging Your PC with the V-Series 181

Stephen R. Davis/Squeezing performance out of PCs has always been an expensive proposition that required add-in coprocessor boards. Up until now, that is: NEC's innovative V-series chips are designed to be inexpensive replacements for your PC's 8088 (or your compatible's 8086) central processing unit. PC Magazine Labs benchmark tests show that

the V-series significantly outperforms the 8088 and, best of all, does it without sacrificing PC compatibility.

An Ovation for Novation 189

Frank J. Derfler, Jr./Put the pedal to the metal with this speedy new 2400-baud modem, the Novation Professional 2400. More than merely a me-too product in an already crowded market, this communications rocket is more attractively designed and easier to use than the standard fare with such extra features as password protection and plug-in upgrade capability.

LANGUAGES

Serious FORTRAN for the PC 161

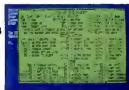
Chris Wolf/Want to put your FORTRAN programming experience to use on the PC? FORTRAN compilers for the IBM PC have shed their slow, cumbersome, and bug-ridden reputation. PC Magazine Labs tests three slick DOS compilers: Microsoft's FORTRAN, IBM's Professional FORTRAN, and Leahy Computer Systems' F77L.

SOFTWARE

TallScreen: More DOS

Power to You 173

Glenn Hart/In a crowded field of DOS enhancers and utilities, *TallScreen* stands out and makes you wonder how you ever got along without it. It can store and queue DOS commands for editing and reissue and has a text editor and a keyboard macro utility as built-in productivity enhancers.



Banish Typos with Spelling Checkers 199

Jon Pepper/Almost everyone can profit from programs that automatically catch and correct keyboarding errors in documents. Here's a look at six spelling checkers.

POWER USER 231

Craig L. Stark/Hardware and software productivity tips: Personalizing *Personal Editor*, changing *WordStar* colors, Epson FX underlining tips, stripping *WordStar*'s high bits, and sending printer control codes.

USER-TO-USER 241

Paul Somerson/Users offer tips on DOS keyboard macros, a disk memo pad, disabling BASIC's Ctrl-Break, and tricky batch files.

PC TUTOR 249

Charles Petzold/Questions and answers on color borders for the PC Jr and loading overlays with DOS function calls.

REVIEWS IN BRIEF 255

David Obregón/Our reviewers take quick looks at IBM's *Drawing Assistant*, a new daisy wheel printer with a great price-to-performance ratio, and a file-management utility.

NEW ON THE MARKET 259

David Obregón/An add-in hard disk and controller card, a programmable protocol translator for RS-232 connections, fanfold stationery, dating-service software, a desktop document scanner, a new digitizing tablet, a LISP language package, a half-height Bernoulli Box from Iomega Corp. and more.

PC-MART 272

PC BLUEBOOK 274

READER SERVICE CARD 285

PRODUCT INDEX 291

BOOK REVIEW

Unleashing the Power of Microsoft Word 293

John Dickinson/Five books, some for novices and some for power users, reveal the wonders of *Microsoft Word*.

INDEX TO ADVERTISERS 299

COMING UP 303

Cover Photograph: Roberto Brosan

1st Place
Graphics
Drawing Division
1985 World Class PC
Contest, PC World



Don't Get Left Out of the Picture!

*Join the thousands who are drawing their way to the top
with PC-Draw.*

Thousands have already discovered our proven ladder to the top. In fact, PC-Draw was voted the favorite graphics drawing package in *PC World's* prestigious 1985 World Class PC Contest. And captured a coveted ICP Million Dollar Award in the same year!

PC-Draw gives you the power to graphically depict your best ideas, plans, designs, and proposals. In color or black and white. Boldly. Powerfully. And then instantly print them with a broad range of printers and plotters.

You'll increase your productivity with quick and easy flowcharts, organization charts and diagrams. And enter meetings with your best ideas more forcefully presented than ever before. PC-Draw lets you create virtually anything that can be drawn with pencil and paper—quickly, easily, and with far greater detail. And you can instantly edit your drawings when updates are necessary, instead of starting from scratch!

PC-Draw runs on the IBM PC, XT, AT[®], or compatibles. It's ideal for flowcharts, organization charts, presentation graphics... and an endless variety of graphs and illustrations. You can produce drawings up to 99 pages long. Common symbols are ready-made

10-DAY
TRIAL
PERIOD

for placement anywhere on the screen. Or generate and store your own unlimited supply of user-defined symbols. We even include special templates which speed some of PC-Draw's most popular applications, including Flowcharting, Electrical Design, Office Layout and Alternate Text.

As always, you'll get free technical support, and the service and reliability of a company that for years has been dedicated to designing the finest graphics software you can buy.

PC-Draw includes an easy-to-follow interactive tutorial. It requires an IBM PC or compatible, graphics adapter and graphics monitor (or IBM monochrome monitor and compatible monochrome graphics card). Graphics boards and light pens are available from Micrografx at excellent prices.

The word is out. So join your office competition on the ladder to the top—with award-winning PC-Draw.

TO ORDER (or for free single-disk demo or brochure) CALL:
1-800-2PC-DRAW. In Texas or for customer support call (214) 234-1769. Micrografx, Inc., 1820 N. Greenville Ave., Richardson, Texas, 75081.

MICROGRAFX[™]

The Picture of Success.

CIRCLE 157 ON READER SERVICE CARD



(Most popular plotters and printers supported.)

Discover **EVEREX**

Feature by Feature

Chapter 2: Tape Backup Systems

■ Flexibility

File by File or Mirror Image Backup/Restore.

■ Backup Time

10 MB in 2 minutes.

■ Ease of Use

Menu Driven Software—Help Screens, Windows.

■ Media

Uses Standard Tape Cartridges.

■ Controller

Everex-Built—QIC-36 Industry Standard.

■ Cables

Totally Shielded—Round, No Crimping.

■ Tape Interchangeability

QIC-24 Industry Standard.

■ Price

Very Attractive Discounts.

■ Error Handling

Handles Bad Sectors on Same or Target Drive During Restore.

■ Configurations

Internal, External and Expansion Chassis Units.

■ Company

The Industry Leader in Tape Backup—Shipped More Controllers Than Any Other Company.

The 10, 20, 60 and 100 MB Tape Backup Systems

are part of a family of peripheral products for your IBM PC, PC/XT, PC/AT—multifunction boards, graphics boards, hard disk storage, modems and expansion systems.

Use this ad to compare us to our competition . . . then call your local dealer for a hands-on demonstration.

See Us at COMDEX/FALL

BOOTH H8018

Department A
47777 Warm Springs Blvd.
Fremont, CA 94539
(415) 498-1111

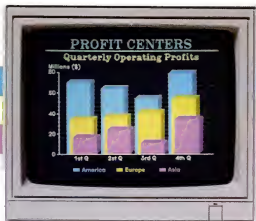
CIRCLE 163 ON READER SERVICE CARD

EVEREX
EVER for Excellence



Inside C
(800) 8

Outs
(800)



VideoShow **MAKES** Presentations

With VideoShow you'll make the best presentations of your career.

VideoShow is the only complete hardware and software presentation system available today. VideoShow:

Makes Your Presentations Powerful

Use 1000 colors to brighten your images... hundreds more than with any other PC-based system. Plus 5 times better resolution. Add VideoShow's dynamic visual effects and you are guaranteed high impact and professional quality.

Makes Presentations Easy

Select from a variety of software, and use your IBM® PC or compatible to create or update any chart, graph, diagram, or illustration in minutes. Even if you've never used a computer before and

can't draw a straight line. All you do is fill in the blanks.

Makes Any Kind of Presentation

VideoShow lets you use any color monitor or video projector. Plus, you can get slides, overheads, or hardcopy. All in 1000 brilliant colors.

VideoShow Makes Sense

At \$3499* it pays for itself after just a few presentations. And you get the superior quality previously available only from expensive services.

VideoShow Puts You in Control

No longer will your presentations be a terrific struggle. They'll just be terrific!

Find out about it. Call 1-800-556-1234, Ext. 234. In Calif., call 1-800-441-2345, Ext. 234.

VideoShow™
from General Parametrics, Berkeley, CA

CIRCLE 177 ON READER SERVICE CARD



*Suggested retail price
VideoShow is a registered trademark of International Business Machines Corporation

THE PC'S LIMITED AT™ —\$1995. THE PC'S LIMITED TURBO PC™ —\$795.



At these prices, it's no wonder
we're burning up the marketplace.

Yes, you can believe it. Since we ran our first advertisement for the PC's Limited AT™ and Turbo PC™, the calls we've received mostly start with comments like "Is this for real?" And "How can that be?" But now that our machines are in the hands of influential buyers, the questions tend to concern quantity discounts for further purchases. (Which are available.) You see, the PC's Limited machines are assembled from components bought worldwide with our strong buying power. Then they are offered directly to you—with no middleman markups. So light a match to your old budgets. With the savings we're providing, you'll have money to burn.

PC'S LIMITED AT™

- 80286-based System Unit (runs at 6MHz)
- 1024K on Mother Board
- 1.2 Meg Floppy Drive
- Combined Floppy/Hard Disk Controller Card
- AT Keyboard
- 192W Power Supply
- 2 Serials and 1 Parallel Port
- Clock/Calendar with Battery Backup

Runs all Major Software written for the IBM PC™, PC XT™, and PC AT™. Unit has 8 Expansion Slots, with 7 available in above configuration. Same Bus Configuration as IBM PC AT™.

PC'S LIMITED TURBO PC™

- 16-bit 8088-2 System Unit (running at 4.77 or 6.66MHz)
- 640K on Mother Board
- 360K Floppy Drive
- Keyboard
- 135W Power Supply

Runs all Major Software written for the IBM PC™ and PC XT™, 40% faster, without modifications. Unit has 8 Expansion Slots, with 7 available in above configuration.

IBM® is a registered trademark of International Business Machines Corporation.
IBM PC, PC XT, and PC AT are trademarks of International Business Machines Corporation.



PC'S LIMITED™

OUTSIDE TEXAS, ORDERS ONLY, CALL 1-800-426-5150

1611 Headway Circle, Building 3, Austin, Texas 78754

All sales-related calls inside Texas — (512) 339-6800

Telex No. 9103808386 PC LTD

Ad num

THIS IS NOT BS

(Bank-Switching)



'MMU' CHIP ▶

▶ 'MMU' MODULE



THE NEW BREED OF MULTIFUNCTION CARDS.

ALL CARD AT1

With AST SIXPAK, QUADBOARD, JRAM, or the newer INTEL ABOVE BOARD, you limit your PC growth. The **ALL CARD AT1** is expandable to 2MB on board (4 MB in two slots) and FULL MEGABYTE POWER with the ALL "MMU" Module Option. **ALL CARD AT1** starts with all the multi-function features and 256K at \$445. Even the standards are designed for software of the future—the calendar clock has non-volatile RAM with alarm interrupts and the serial port has multiple addresses. Also, mix 64 & 256K chips.

ALL CARD AT1/M

This model comes equipped with all the features of **ALL CARD AT1** plus the ALL "MMU" Module Option which includes ALL/MOS (Memory Operating Software). With a simple menu-driven installation procedure, ALL/MOS converts your existing software to 1MB DOS, and delivers FULL MEGABYTE POWER.

'FULL MEGABYTE POWER'

1 MEGABYTE DOS. Break the 640K barrier. Run existing versions of the popular business packages IN 1 MB including 1.2.3, SYMPHONY, FRAMEWORK, dBASE, APL, TOPVIEW, SIDEKICK, MULTILINK, CROSSTALK, TURBO PASCAL, C86, IBM MACRO ASSEMBLER, MULTIMATE, WORDSTAR, NOVELL, PC NET.....

4 MEGABYTE EXPANDED MEMORY SPEC. Run 4 megabyte software conforming to the LOTUS/INTEL/MICROSOFT specification, with enhancements. SYMPHONY 1.1 has already been released and 1.2.3, FRAMEWORK and others are coming.

MULTI-MEGABYTE, MMU PROTECTED RAM DISK. Run **ALL DISK** as large as you like with full assurance that it is fully hardware protected from inadvertent tampering by you, others, or programs with 'bugs'.

FUTURE INDUSTRY EXTENDED MEMORY SPEC. Run higher performance software conforming to the future specification for machines equipped with MMU. IBM PC AT is IBM's first personal computer with MMU. With **ALL CARD** your PC and XT also have MMU.

Full megabyte power means you can run all of the above either individually or together. And more. Provide Memory Management Unit (MMU) hardware for DOS/UNIX and other multitasking, multiuser and VM (Virtual Machines) operating systems of the future.

*4 is a registered trademark of International Business Corporation. UNIX is a registered trademark of Bell Laboratories. 1-2-3, Symphony, Framework, APL, Topview,

Board AST, Sixpak, Quadboard, JRAM, INTEL, dBASE, Sidekick, Multilink, Crosstalk, Turbo Pascal, C86, Multi-Mate, Wordstar, NOVELL, PC NET are of the respective companies. **ALL CARD** is a trademark of **ALL Computers Inc.**

ONLY ALL CARD™ WITH 'MMU' FOR THE IBM PC, XT & COMPATIBLES DELIVERS FULL MEGABYTE POWER FOR SYMPHONY, 1-2-3, FRAMEWORK, APL, TOPVIEW... ABOVE BOARD, AST, QUADRAM AND OTHERS WITH BS CAN'T DO IT. IBM PC AT CAN'T DO IT.

Memory is the single most important part of a computer. A faster CPU can save you minutes, but more memory can save you hours. More memory consolidates multiple jobs and spreadsheets into a single run. The result is the job is simpler to design, faster to run, and much less error prone. Picking the right method to expand memory is vital to the future life of your PC. This is what the industry is saying about 'MMU' and Bank-Switching...

PC Magazine—May 14, 1985

“Several industry leaders have echoed... concern that (Bank-Switching) is only a stop gap measure on the way to full use of... on chip memory management (MMU). PC Magazine shares that concern.”

PC Week—April 16, 1985

“MMU, a function that controls how memory is addressed, is more sophisticated than Bank-Switching techniques”

PC Magazine—June 11, 1985

“Spring COMDEX..... The introduction of a memory expansion card (ALL CARD) with full memory management facilities for 4 megabytes of on-board PC RAM was one of the more exciting of these developments”

“..... (ALL Computers Inc.) seems to have stolen a march on the major board makers”

Personal Computing—August, 1985

“Alone and away from the din over Bank-Switching technology.... a four megabyte, multifunction board (ALL CARD) that allows almost all software to utilize its memory right out of the box.”

There is clearly only one way of the future—full memory management! In the past, Bank-Switching was obsoleted by MMU with mainframes and again with minicomputers—and now with personal computers. ALL CARD gives you the best of both worlds — Bank-Switching and MMU. ALL CARD stands alone with its proprietary MMU CHIP for the IBM PC. It alone can run 10 times as many packages and run them faster. It alone can be plugged into a 64K, 640K or even a 2MB PC and run concurrent combinations of 1MB DOS (MMU), 4MB LOTUS/INTEL/MICROSOFT spec. (Bank-Switching) and RAM DISK. Only ALL CARD gives you 974,848 bytes total memory for DOS —type A>CHKDSK on your PC and compare.

ALL CARD is your best choice by far.

SPECIAL \$100 OFFER

Buy the ALL CARD AT1/M with 256K for \$895 or AT 1 for \$445 and for an additional \$100 get your card populated with a full megabyte. Offer is limited. Act now! Order your ALL CARD today.

ALL Computers Inc

102 Bloor St., W., 12th Floor,
TORONTO, CANADA M5S 1M9.

CIRCLE 357 ON READER SERVICE
(416) 960-0111 TELEX 06-985

Any way you look at us, Computer Logics makes sense.

Computer Logics. We're the sensible choice for micro-to-mainframe communications. We offer a full family of emulation products for IBM, Sperry, DEC, Honeywell and Burroughs systems. We developed the first internal 2400 baud, Bell 201-C compatible synchronous modem card. We back our products with in-depth technical resources and expertise. A proven quality record. Total support anywhere in North America. The right price. If that's what you're looking for, we should talk. Face to face. Give us a call.



Computer Logics

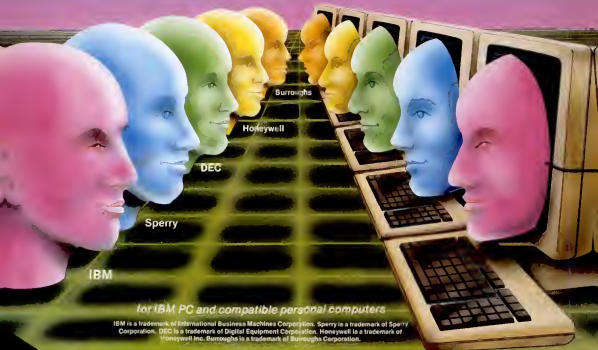
Product Information Centre:

United States:

Computer Logics Ltd., Inc., 2800 Rockcreek Parkway, Suite 300,
N. Kansas City, Missouri, 64117 1(800) 235-0030

Canada:

Computer Logics Limited, 1(800) 323-0030



for IBM PC and compatible personal computers

IBM is a trademark of International Business Machines Corporation. Sperry is a trademark of Sperry Corporation. DEC is a trademark of Digital Equipment Corporation. Honeywell is a trademark of Honeywell Inc. Burroughs is a trademark of Burroughs Corporation.



a member of the Canada Lease group of companies

CIRCLE 103 ON READER SERVICE CARD



What's Inside

In looking at the most colorful peripheral your PC could have, PC Magazine Labs had to dig beneath the playful nature of plotters for cold, scientific facts.

Over the course of this year, *PC Magazine* has written quite a bit about graphics software. In June, we reviewed 36 business presentation programs in "Business Graphics: Giving Power to Presentations" (*PC Magazine*, Volume 4 Number 12) and reproduced a sample output of each. Several months later, faced with some dauntingly sophisticated graphics packages, we hired some artists to help us explore their fine-arts capabilities for "Design Tools for the PC" (*PC Magazine*, Volume 4 Number 20). And when IBM jumped on the graphics bandwagon, we featured its business presentation program in "PC Storyboard: Business Graphics Get Moving" (*PC Magazine*, Volume 4 Number 22), calling it the best software we've seen from Big Blue in a long time.

Graphics is a popular subject with many of us here, as it is with you, our readers. After all, most of us would rather look at the bottom line spruced up with color in two dimensions than read a row of flat figures. Graphics software forces our PCs to show off their finest features, but even the snazziest package running on an EGA system won't have much impact unless it has an effective means of conveying its images to a wider audience.

So, for this, our last issue of the year, we reviewed two dozen plotters, the most commonly used graphic-output device for the PC.

The units we selected range in price from \$399 to \$5,950 and are presented in ascending order. They provide a range of features, which are compared in the table on page 122.



Contributing editor Glenn Hart tested all 24, and while some gave markedly better performances than others—the poorer plotters showing their true colors—not a single one produced what we would call a really bad plot. For a close-up comparison of the entire two dozen, see the enlarged output samples on pages 128 and 129.

Fast Results

When you use computer graphics for business applications, the bottom line is speed. If you have to prepare 25 pie charts for your morning meeting, you need a plotter that can get the job done fast. A plotter uses one of two methods to do its work, one faster than the other. It uses either hardware fonts embedded in its own ROM—that's the faster method—or software fonts from the graphics program. The software fonts produce a fancier-looking

plot, but they eat up more time. PC Magazine Labs timed both methods and reports the results in the benchmark charts on page 113. Time is of the essence here, so the results shown for plotters using ROM fonts, though rougher than their software cousins, are the significant ones.

To test the plotters fairly, the same software must drive each device. We chose *KeyChart*, from Softkey Software Products Inc. in Toronto, Canada, because it was capable of driving all 24 units reviewed. In a couple of cases, the helpful Softkey people actually wrote the drivers for specific plotters. See page 111 for Hart's review of this software package.

Hart runs his own business, Glenn A. Hart Associates in Monsey, New York, so his experience with plotters, both as a user and as a recommender, made him particularly well-suited for PC Magazine Labs' plotter project. Naturally, a task of this scope—testing and writing about all 24 units—kept him working long into the night on more than one occasion. We knew that he could do the job, and, when, at the end of a particularly long night, his enthusiasm about plotters showed no sign of waning, we were certain we had chosen the right guy to do the job.

"I'm sitting here in the lab surrounded by two dozen plotters, hundreds of various pens, RS-232 breakout boxes, Smartcables and not-so-smart cables, and the test equipment and other paraphernalia of the hardware reviewer. I've had plotters on the brain (and ink on my fingers) for we'll never know how long now, but it's been a pleasure.

"Beyond all their practical

On March 30, 1985, the freighter **MERCEDES** was deliberately dynamited and sunk, becoming an artificial reef and diving wreck.

Boca Raton, home of the IBM PC needs a fishing and diving reef too.

The Great Recall: IBM PC-AT Hard Disk Drives

We're gonna deep-six thousands of 'em.
Simply because that's where they belong.

BUY A DRIVE, GET A REEF.

We'll allow you a \$1,000 rebate on the CORE ATplus40™ High Performance hard disk upgrade kit, when you send us your IBM PC-AT factory issue hard disk drive.

Help us build the world's first low-technology artificial reef.

The ATplus40™ drive has double the capacity of the standard IBM 20MB drive, runs 30% faster, and has reliability second to none.

It sells for \$2,595. With the \$1,000 Rebate, your effective cost is \$1,595. Even compared to IBM's newest drive (30MB) we are still 30% faster, hold 10MB more, and cost \$400 less.

DRIVE FAILURE: NOT "IF?", BUT "WHEN?"

We feel it is time to consider your alternatives.

You already know about the IBM factory-issue drive's problems.

Problems like losing five or six pages of a spreadsheet. And the template for it that took two weeks to create.

Problems like important correspondence and contracts disappearing from the word-processing files. And problems like lost Accounts Receivable, or worse. Payroll records.

How about the random failures, the thousands of users that are progressively losing data — part of a file here, two files there.

THE CRASH OF '86.

InfoWorld, a highly respected computer weekly, conducted an intensive evaluation of IBM's hard disk and CORE's ATplus™ 20MB drive. They went beyond routine speed and technical comparisons, evaluating resistance to head crashes with destructive testing.

Like bumping, dropping and slamming the drives while the computer was in use.

"It [the IBM drive] was the only unit that failed every bump test, destroying data and developing bad bytes with even the gentlest of tests. Because the jostling of test 1 is fairly common in offices, the chances of your losing data with the [IBM] drive are good with only normal, regular use, precisely the problem reported by many AT users. During the [more severe] test 2, the [IBM] disk came close to self-destruction... We do not recommend its use."

In summary, they said, "...the hard disk drives supplied as standard in the [IBM] AT are unreliable, destroying data and requiring many trips to service centers for reformatting and exchanges."

AN EDITOR'S ODYSSEY.

"The bottom line is that IBM is not maintaining the reputation for quality products that has made it so successful in the business world," says John Dickinson, a contributing editor to PC Magazine, a leading periodical for IBM personal computer users.

Consider his AT hard disk ordeal: His original AT Enhanced model's hard-disk began failing after six-months of light use.

Two replacements from IBM also failed to perform.

The third IBM drive failed to write most of a word-processing file.

While he goes into much detail in

the story, Mr. Dickinson concludes that, "There have been plenty of 'authoritarian' reasons given in the press about the cause of the AT's disk problems— none of course, come from IBM. Wherever they come from, my experiences support all the popular theories..."

EASY MONEY.

Buy the ATplus40™.

Everything is supplied, your ATplus40™ is designed for you to install, probably in less than a half-hour.

No technicians are necessary. We include free, CORE's special COPY program so you can painlessly copy all your programs and data from the factory-issue drive to the co-installed ATplus40™.

Then remove the IBM 20MB drive, pack it using the ATplus40™ box, and return it to CORE prepaid. Upon our receiving your old IBM 20MB drive, we'll send you a check in the amount of \$1,000.

It's that easy!

SEAL OF APPROVAL.

InfoWorld's testing the ATplus™ in comparison with the IBM drive actually confirms exactly what we have been saying all along: "Now you can build the IBM PC-AT that IBM didn't."

CORE's ATplus™ passed all of their tests. InfoWorld went on to say, "[CORE's] hard disk drive is built like a Sherman tank, offering exceptional per-

formance and reliability. Even novices should be able to install the kit, and technical support is good."

PC Magazine, in another in-depth article says, "CORE International's big, fast, rough add-in mass storage systems for the IBM PC-AT use proven technology to gain speed, [increase] capacity, and avoid the problems said to plague the AT's factory issue hard disk."

PEACE OF MIND.

We're the world's largest supplier of high-performance PC-AT compatible hard disk drives.

And respected magazines such as PC Week, InfoWorld and PC Magazine have told you how we got there.

ATplus drives are available from or in use by Computerland, General Micro, MicroAge, Incopac, Businessland, Entre, NASA, GE, EXXON, the Department of Defense, the White House, Rockwell International, AT&T, major universities such as UCLA, USC, LSU, and get this — even IBM.

Our drives come with a full one-year warranty, centrally managed by CORE and supported by us and other major maintenance service companies.

ALL GOOD THINGS MUST COME TO AN END.

Like the Great IBM AT Hard Disk Recall.

So, before you suffer the agony of a drive failure, before you experience the tedium of restoring data to a dubious drive, before January 31 rolls around, get in on the Great IBM AT Hard Disk Recall.

Call us, or see your local dealer.

Now available for
PC-XT and Compatibles

CORE
INTERNATIONAL

7171 North Federal Highway Boca Raton, Florida 33431
Telex: 315 809 CORE INTL DEBE

305/997-6055

IBM is a registered trademark of International Business Machines Corporation.

© 1985 CORE International, Inc.

ATplus is a trademark of CORE International, Inc.

CIRCLE 225 ON READER SERVICE CARD

"Dac-Easy Accounting is a genuinely amazing deal."

PC Magazine, October 15, 1985

"I've never before in a review come right out and told readers to buy a product, but I'm doing it now. Dac-Easy is an incredible value."

PC Week, August 27, 1985

"Amazing". "Incredible". "Unbelievable". That's how the industry's most important reviewers describe Dac-Easy Accounting — Dac Software's feature-packed, fully integrated accounting package priced at only \$69.95. They compare it favorably to accounting packages (sold module by module) costing up to five thousand dollars!



Seven powerful, integrated modules

But it's more than our price that has the critics raving. Compare our features to those of any other account-

ing package at any price.

Dac-Easy Accounting offers instant access to General Ledger, Accounts Receivable, Accounts Payable, Inventory, Purchase Order, Billing and Forecasting. Perfect integration between all seven modules gives you fast, accurate, flexible management of information. Data entered once is automatically posted to all pertinent modules. And Dac-Easy is designed to manage both product and service oriented businesses.



Three-year history maintained, with forecasting

Only Dac-Easy maintains a three-year history on all principal files, and provides spreadsheet-like forecasting based on this history.

Plus, you can generate any of 300 different reports for instant access to the exact information you need.

Find out for yourself why Dac-Easy is the fastest selling accounting package in history. Call us today!

Dac-Easy Accounting

\$9.95

"Dac-Easy is remarkable, amazing, revolutionary, sensational..."

Computer Buyer's Guide & Handbook
September 1985

PARTIAL LIST OF FEATURES

General Information

- Menu driven
- Password protection
- File capacity limited only by disk space
- Support contract available

General Ledger

- Unlimited multi-level accounts
- Three-year account history for CRT inquiry
- Pencil and pen feature to correct mistakes
- Unique budgeting routine
- CRT transaction inquiry
- Activity report, trial balance, financial statements, unlimited departments and journals

Accounts Receivable

- Open invoice or balance forward
- Customized aging report
- Unlimited number of customers
- Flexible mailing labels and directories
- Support partial payments & finance charges
- Three-year customer history for number of invoices, sales, costs, and profits
- Customized statements
- Cash flow analysis/sales analysis
- Automatic sales forecasting
- Check printing with multiple invoices and cash available routines
- Aging reports with seven customized columns
- Unlimited number of vendors
- Flexible mailing labels and directories
- Three-year vendor history
- Unlimited allocations per invoice

Inventory

- Supports average, last purchase, and standard costing methods
- Powerful physical inventory routines
- Accepts any unit of measure
- Three-year product history in units, dollars, cost, and profits
- Automatic forecast of product sales
- Automatic pricing assignments
- Alert and activity reports with 11 sorts
- CRT shows on-hand/on-order/committed/sales/cost/profit turns CRT

Purchase Order

- Inventory and non-inventory items
- Allows up to 50 lines per PO
- Per line discount on %
- PO accepts generic discounts/freight/taxes/insurance
- PO accepts back orders and returns
- Purchase journal

Billing

- Customer or inventory invoicing on plain or preprinted forms with remarks
- Prints sales journal
- Allows return credit memo

Forecasting

- Unique program that automatically forecasts using your history
- Revenue and expense accounts
- Vendor purchases
- Customer sales, cost, and profit
- Inventory items usage
- Forecast by same as last year, or % base from last year, or trend, or least square trend line analysis method



"EDITOR'S CHOICE"
PC MAGAZINE

"Despite its low price, Dac-Easy includes a lot of extras that you wouldn't expect to find even in a more expensive package."

Bill Machrone, Editor
PC Magazine, October 15, 1985

"This is an incredibly good value."

InfoWorld, September 23, 1985
Rated 4 disks

To Order Call Toll Free

1-800-431-0800

Ask For Operator 2122A

For More Information

214-458-0038

© dac software, inc 4801 Spring Valley, Rd.
Building 110-B, Dallas, TX 75244

Send in this coupon with your credit card number, money order or check for \$69.95 plus \$7.50 for postage and handling. In Texas, add 6 1/2% sales tax (\$4.28). U.S. prices only.

☐ CHECK ☐ MONEY ORDER
☐ AMEX ☐ VISA ☐ MASTERCARD Expires _____

Account No. _____

Name _____

Company Name _____

Address _____

City _____ State _____ Zip _____

Phone _____

Signature _____

30 Day Money Back Guarantee: dac software, inc. provides a 30-day money back guarantee that all claims and features listed in this ad are true.

Minimum Hardware Requirements:
IBM (PC, XT, or AT) or other compatibles, 128K memory, one 5 1/4 DSD floppy disk, 132 column printer in compressed mode, 80X24 CRT, MS-DOS, PC DOS 2.0 or later.

*Trademark of International Business Machines Corporation
*Trademark of Microsoft Corporation.

Dac-Easy Accounting

WHAT'S INSIDE

tions, I still find that plotters are fun to watch. There's something magical and mysterious about them; watching a brightly colored image take shape excites both computer expert and layman alike."

New Talent

Glenn Hart is a regular voice in our pages, but this issue also welcomes a couple of newcomers to *PC Magazine*. As part of our ongoing look at the languages you

program in, Chris Wolf, who manages computer services in the agricultural economics department at Michigan State University in East Lansing, reviewed three FORTRAN compilers. "Serious FORTRAN for the PC" (see page 161) takes a look at products from two big names, IBM and Microsoft, and a smaller one, Lahey, which incidentally turned out to be the compiler of choice.

The second newcomer, Stephen R. Davis from Greenville, Texas, is not just an-

TIME IS PRICELESS.



But for \$99.95* you can.....Save it, track it, bill it, graph it, and report it with **timeslips™** from NORTH EDGE SOFTWARE CORP.

THE FIRST SOFTWARE PACKAGE THAT COMBINES EVERYTHING YOU NEED TO TRACK, BILL, GRAPH AND REPORT TIME.

IF TIME TRACKING IS IMPORTANT TO YOU—PHONE TIME, CONSULTING TIME, COMPUTER TIME...

ANY TIME—TIMESLIPS™ WILL DO IT!

- Pop-up or foreground operation of the timer module.
- Professional bill generation including non-time charges.
- Stopwatch timing of up to 16 operations at once.
- Powerful report generator analyzes time and productivity.
- Versatile export capabilities to spreadsheets and data bases.
- Generates bar and square pie charts without a graphics card.
- Merges Timeslips™ from other computers into a single report.
- Security with keyboard lock and password feature.
- Creates detailed time and activity reports for the IRS.
- Runs on IBM PC/XT/AT and true compatibles.

ORDER TODAY BY CALLING **TOLL FREE 1-800-225-5669**
VISA AND MC ACCEPTED (ORDERS ONLY PLEASE)

____north edge____
____software____
____corp____

FOR MORE INFORMATION CONTACT:
NORTH EDGE SOFTWARE CORP.
P.O. BOX 286
HAMILTON, MA 01936 (617) 468-7678

* plus s/h

CIRCLE 477 ON READER SERVICE CARD

When you use computer graphics for business applications, the bottom line is speed. You need a plotter that can get the job done fast.

other informed opinion; he's a real "do-it-yourself" kind of guy. He discovered a \$25 speed solution. Davis installed a Nippon Electric Corp. (NEC) V20 chip in his PC and ran our standard benchmarks to document the improvement. Although the results were not as dramatic as he initially hoped, the NEC chip did significantly accelerate the speed of mathematically oriented programs and brought about a slight improvement in general programs (see "Turbocharging Your PC with the V-Series," page 181).

There's more from the *PC Magazine* regulars in this issue. Jon Pepper reviews six spelling checkers (see "Banish Typos with Spelling Checkers," page 199). Winn Rosch evaluates graphics boards from Paradise and Genoa. Look for the comparative review on page 147.

There's no telling what the new year will bring—we do keep some things secret around here—but we can guarantee all these writers will be back, bringing you more comparative product reviews, more *PC Magazine* benchmark tests, and more bright ideas to help you work better and smarter. So take a look around. We think you'll like what's here, and what's coming for 1986.



Pick A Racehorse, A Workhorse, Or Your Choice Of Saddles

VAR's & VAD's now have a choice of PC and AT compatible computers and a complete range of enhancement products all in one place. And you won't be dealing with rookies either. Basic Time has been a computer manufacturer and distributor since 1975. We have the experience and proven ability to offer systems integrators the products and service they need.

Run With Our Racehorse—The BT/AT.

This 80286 computer with 28ms average access time 44Mb drive runs circles around the IBM™ AT. It's complete with Hercules compatible monochrome monitor (color optional), a fistful of I/O ports, keyboard, 1.2 Mb/360k floppy, and 640k of RAM, MS-DOS and GW-BASIC. All this and more at the lowest price available for an AT compatible*.

Try Our Workhorse—The BT/XT.

A new standard in price/performance for an 8088 computer. 8 slots, 256k RAM, AT type keyboard, Hercules compatible monochrome monitor and adapter, 20 Meg hard disk, floppy drive, 130 watt power supply, MS-DOS, and full PC compatibility.

external modems. Hard disk storage is simple and reliable with our 20 Mb systems for PC's and BT44 and BT70 Mb drives for AT's. Tape backup systems are available to secure your data too. Need more memory and I/O ports? The BT6Plus and AT4x4Plus multifunction boards give you unrivaled bang for your buck.

For more details on how your company can offer it's customers more performance while you concentrate on one vendor instead of five, call or write:

Department P
3350 Scott Blvd.,
Bldg. 52
Santa Clara, Ca. 95054

Inside California
(800) 841-2474

Outside California
(800) 323-8437

Your Choice

Of Saddles. Either horse you choose we can outfit you completely. Our HR series monitors support monochrome, color, or EGA adapters. Communication is easy with Basic Time internal or

CIRCLE 372 ON READER SERVICE CARD

basic time

*Infoworld Sept. 2, 1985, Page 1.



A FEW GOOD REASONS TO BUY A NEW CANON PERSONAL COMPUTER.

Canon Personal Computers run all popular IBM PC-compatible software.

If you're in the market for a smart, fast, modestly priced personal computer that's IBM-compatible, look no further. Canon has just created the ideal series.

The Canon Personal Computer A-200 Series can run hundreds of programs designed for the IBM PC family. Without modification. Even the layout of the keyboard is compatible with the IBM PCs. And with its 16-bit microprocessor, memory and display adapter, each can process complex data in record time.

They expand as you expand.

As your needs change, so can Canon Personal Computers. Each comes with built-in parallel and serial ports. And with expansion capability in most models, you can modify the system according to your own needs.

You can add optional IBM-compatible hardware, too. Like the Canon memory expansion board. Or one of Canon's full line of quality printers, including the advanced laser beam printer.

Canon's three-for-all.

The Canon Personal Computer A-200 Series offers three ways to enter the world of personal computers.

The standard floppy disk model is a ready-to-run, compact system with 256K bytes of memory, expandable to 512K bytes. It offers a choice of monochrome or color graphic display and two 5 1/4" 360K byte drives.

The powerful hard disk model runs complex business software with even more speed and greater storage memory capacity. It comes with a 5 1/4" 360K byte floppy disk drive and a 10M byte hard disk drive.

And the transportable model weighs in at a low 19 pounds, so it's perfect for the business professional on the move. It features a 512K

byte memory, full-sized graphic LCD screen and two 360K byte floppy disk drives. Plus, the RGB color monitor interface lets you use the transportable model with a color graphic display. And the transportable model has a built-in 300/1200 bps modem.

What's in a name?

Plenty, when that name is Canon. Every Canon Personal Computer is the product of a company world-renowned for quality and innovation. So when you enter the computer age with Canon, you know you're in good company.

For more information, see your local computer dealer or call 1-800-323-1717, x325. (In Illinois, 1-800-942-8888, x325)



Canon®

Canon U.S.A., Inc., One Canon Plaza, Lake Success, NY 11042
© 1985 Canon U.S.A., Inc.

CIRCLE 479 ON READER SERVICE CARD

Actually, we give you two things free.

Our source code. And your freedom.

Just buy part or all of our excellent integrated business accounting system, the SBT Accounting Software Library.

We'll give you our source code absolutely free.

Which, in turn, gives you the freedom to customize our software to fit your business needs.

Say, for instance, you want to change the way a management report is formatted. Our free source code enables you to change it.

What's more, the change will be quick and simple because our software is written in easy-to-use dBASE.

In fact, the entire SBT Accounting Software Library runs with dBASE III or dBASE II* so you get the power and flexibility of those best-selling programs. Plus the freedom to use any computer that runs dBASE.

The SBT Accounting Software Library. Great software and freedom. All in the same box.

Call today for our demo disk and brochure.
(415) 331-9900.

THE SBT ACCOUNTING SOFTWARE LIBRARY.

dProfessional	Time & Billing	\$395
dOrder	Sales Order Processing	\$195
dInvoice	Billing/Inventory Control	\$195
dStatement	Accounts Receivable	\$ 95
dPurchase	Purchase Order	\$195
dPayable	Accounts Payable	\$295
dPayroll	Payroll/Labor	\$395
dLedger	General Ledger/Finance	\$395
dAssets	Asset/Depreciation	\$195
dProject	Project/Job Accounting	\$395
dBackup	Menu/Backup	\$ 65

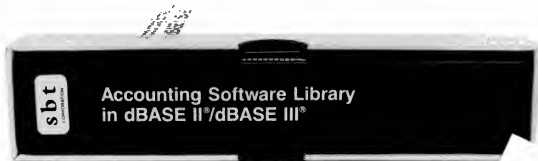


Three Harbor Drive
Sausalito, CA 94965
(415) 331-9900

Call today for the name of the SBT consultant
in your area.



Free source code in every box.



*Compiled versions are also available. dBASE III and dBASE II are registered trademarks of Ashton-Tate, Inc. Copyright 1985, SBT Corporation

CIRCLE 470 ON READER SERVICE CARD

CRAFTSMAN™ QUALITY SOFTWARE FOR 'C' & OTHER PROGRAMMERS

C-TREE

B-Tree File Manager, Source Code, No Royalties!

A b-tree can be inflated with bugs, so before buying on sight its age. In a stand of saplings, this one is a real cooquos. C-tree™ has been around since 1979. (It became Digital Research's Access Manager™). That means we

TEXT TOOLBOX New Expanded Version

License has assembled a cluster of the most useful UNIX™ text management tools into a single package. This new version resembles WordStar's file idiosyncrasies.

Grep™ looks for text patterns in any number of files. Want all occurrences of a global variable throughout a program system? Want to search all files in a directory, down paths to other directories, or all files on a disk? Need to find all the function calls in an entire program system? Grep can do it with a powerful expression syntax that goes far beyond your text editor's search command.

Split™ substitutes new text for matches found using grep's syntax. "Files" can merge or erase files down paths to the point of eliminating full directory structures.

"Diff" compares text files line for line. Its output is a precise list of instructions telling what to do to make the files the same, a list to give to "ed" to handle.

"Ed" is similar to the well-known Unix editor. It offers search and replace with grep syntax, block moves, read-write, line numbering, append, insert, delete, etc. You can instruct "ed" to apply a file of commands to any number of target files, even complicated chains of text additions, such as output from "diff".

Product: L2200 Binary \$130 \$99
L2205 With Source \$240 \$195

PRE-C

Through "Lint"-like Analysis Now on the PC

Unix users have always had "lint" to thoroughly clean programs before they disappear into a compiler. Pre-C™ looks larger than "lint". It finds problems your compiler won't. Problems that a debugger will have trouble figuring out. Even problems which will cause trouble with other compilers.

Pre-C finds all the syntactical twizzles that will blow out a compiler, sure, but a good after-salder problems, code which will never be accepted, casts with suspect conversions, variables declared as external but never used, functions never called, obsolete usage (even C has changed), and type-dependent expressions which will inhibit portability.

But the big service of "lar" is this: Compiles work with one module at a time. By noting errors in the module which only need up at link time, Pre-C looks at all segments of your program at once and reports to you any inconsistencies in inter-module references, conflicting data type declarations, parameter lists

signed, study code which hasn't crinkled across the weight of prolonged and widespread use.

C-tree comes in C source code, revealing all you've ever wanted to know about how b-trees are written. Provided you bind it into your binary application, you can re-distribute C-tree without royalties. Not enough? Try this: C-tree's design splits nodes to allow any number of users to access an index file simultaneously even when updates are in progress. So multi-user configurations and adaptation to networks are possible. You must write record-locking routines, as they are compiler and operating system dependent, but the documentation shows how.

The latest version has new features: support of variable record length files, multiple key indexes in a single physical file.

Thanks to source code, C-tree can not deviate from the K&B standard. C-tree can travel. Binary equivalents have always been tricky. A substitute file manager for migration to a different compiler, operating system, or computer, then changing all the function calls program-wide; then re-writing code to accommodate in many environments prove that C-tree gives your application a ticket to any where.

C-tree permits any number of keys for a data file, supports duplicate keys, signed numbers or numeric, etc., etc.—It's a comprehensive product with everything you'd expect. Intellegently designed, too, comparing both high level ISAM routines with index methods coding by hand with all details of adding a record; as well as well as step-by-step functions you can access directly. Extra pay C-tree maintains optimal performance, which will find a record among a million ten-byte keys in no more than five disk seeks.

Product Code: F0600 \$ Our Price \$329
Last Price \$386

in function calls which disagree with the functions themselves in number or data type; declarations of external functions which differ from their definition.

Pre-C uses the Unix System C compiler standard to guarantee maximum portability. Any problem in the C world. There are plentiful command line options to relax such rigor: forgive functions left incomplete during early release, for example, or vouchsafe nested comments.

Moreover, the output of each analysis can be filed for use with subsequent Pre-C runs, to avoid redundant work.

Use purchased binary libraries? Then send us the names of the libraries, their argument lists and their types, and Pre-C will thereafter insure that calls to them from any C program are letter perfect. Buy product A. A miracle worker in speeding large system development. Needs 128K minimum, 192K recommended.

Product Code: P0590 \$ Our Price \$295
Last Price \$385

TERMS AND CONDITIONS OF SALE

Licensees: Each price is for a license to use a product on a single computer and does not contain its ownership. We will require for you about all licenses. Except for those coded "P", products may be used to create programs for distribution without royalty payment or additional license, provided said programs do not substantially replicate the program's mechanisms. Compatibility: PC BRAND's standard products are designed to operate with the IBM® PC, XT or AT, and PC-DOS and PC-XT. We also have IBM of RAM units available. Non IBM machines use MS-DOS. Ask us about compatibility, but we cannot know for sure. Returns: Defective parts will be replaced. Products coded "C" are rendered unreturnable if you open sealed envelopes containing disclaimers. Services, call for authorization to return a product for refund or credit.

Payment: We honor MasterCard, Visa, American Express, (no surcharge), wheel funds, checks in advance (in NY State, add sales tax), and will ship COD/US only for cash, money order, or certified check. If you prefer to purchase on account from larger corporations and institutions at our discretion, if you agree to net 30 days plus 2% a month penalty thereafter.

Shipping & Handling: U.S.: UPS. Europe: 1st class airmail. 2nd Day Air. Product \$10, each add \$1.50. UPS 1st Day Air or Federal Express 1-2 Day Air: 1st product \$18, each add \$1. FedEx 1st Day Air: 1st product \$28, each add \$1. International: Charges vary by destination and carrier. 110 per shipping container for export items. Air parcel post at your risk beyond collected insurable amount.

TOOLWORKS C COMPILER

NEW!

Benchmarks Embarrass Biggies at Giveaway Price!

or brand more over. If you are looking for memory, Toolworks C has the edge. Or for getting straightforward jobs done, we are happy to end your search.

Take a peek at the prices below, then look at the benchmarks. We have here a bargain C compiler with some very respectable clockings against not only low price compilers, but even against big league file processors. The tools will surprise you (will you look at floating point?)

Let's see it. Our Toolworks™ C doesn't have the full repertoire of features. But maybe you don't need them just yet. If the small memory model (16K for program and data each) will keep you busy for now, are you haven't yet found a reason for double precision math, if what you really need is to create C code and get it compiled, and you don't mind doing it at several hundred dollars less, then Toolworks C will be happy to generate remarkably fast and efficient code for you.

To save the most, get the essential com-

piler—restricted to integer math values not exceeding a 32K. Or order the Mathpak as well and receive a library capable of single precision floating point and long integers, as well as trigonometric, hyperbolic, logarithmic and power functions.

Toolworks C has a configuration program to change the compiler's default option settings, and a run-time profiler to record bottlenecks. It can generate either object code or assembler compatible with Microsoft's MASM, and gives you source code of its complete standard library, which includes access to DOS and BIOS interrupts.

Our compiler doesn't care what generation of DOS you are creating for. Toolworks C supports register variables; can use the 8087 math chip, even has an exec() function which will branch to another program or a DOS transient and return.

It's simply packaged. Notwithstanding our evaluators tell us that it is easier to use than most compilers, and no bugs were found. Not surprising. This compiler is not new. It started life under CP/M. Thousands of keypunchers brought the original to perfection's model. We're so confident of reliability that if you are the first to document a bug, you can keep the compiler, and we'll refund your money. Product TCO01

Compiler & Runtime Library \$49.95

Product TMO01 Mathpak for Plots & Longs \$29.95

30-DAY MONEY-BACK GUARANTEE

Even after using the program disks, you may return any product in this space not coded "C" (try requirements of its supplier) within 30 days for full refund of purchase price, provided it remains in our packaging in resalable condition.

BENCHMARK RESULTS (key below)										Best score indexed to 100		Compile	
	#1a	#1b	#2	#3	#4	#5	#6	#7	Time	Size	Time	Size	Time
Toolworks	180	100	100	213	139	146/200	61k	181/218	61k	182	135		
Lattice		240	140	100	100	103/100	105/100	59k	265	121			
Delphi			107	100	100	100/110	100/110	80k	100	112			
Excel		180	118	116	116	101/110	105/143	141	171	100			
#2. Function calls													
#3. Character counting													
#4. String copy using pointers													
#5. File copy using gcc. port. Bcopy/harddisk													
#6. File creation, Bcopy/harddisk													
#7. Max. memory allocated using malloc()													

DBC Lattice Library Maintains dBASE Compatible Files With the Power and Speed of C

There are a lot of dBASE™ file users out there. Most of them just keep data bases and use dBASE's limited reporting facilities. They're not programmers, so they don't use the dBASE programming language. But they'd like more for their efforts, and that's a business opportunity. dBC™ links C to dBASE. It creates and maintains files and their indexes which exactly replicate dBASE file design. So dBASE can read and update these files. And the reverse: dBC can use any files created by dBASE. Now C and dBASE can operate on the same data bases interchangeably.

That opens up the widespread culture of dBASE installation to exploitation by C programmers. Now you can replace the resident dBASE language with the speed of C. And you no longer have to write every line of code, as in the dBASE language, because now you've unlocked C's

vast storehouse of off-the-shelf libraries and utilities. dBC's functions parallel all dBASE's file handling commands, many decomposed to give closer control. The manual is backed by dense source files on disk.

Use dBC for custom work on clients, or use it on its own. It's a complete ISAM file manager for use with the Lattice C compiler whether or not dBASE will be used in tandem, supports all four memory models, and can have extract index and data files open.

Versions	List	Our Price
LC001 for dBASE II	\$50	\$225
LC002 with Source	\$50	\$450
LC003 for dBASE III	\$50	\$225
LC004 with Source	\$50	\$450

Buy both II & III for Extra Discounts

To Order Products or Catalog, Call Us at...

800-PC BRAND

That (800) 722-7263. In NY State or Outside US call (212) *10-4000
PC Brand, P.O. Box 494, New York, N.Y. 10027
TELEX: 667962 (SOFT COMM NYK)

Prices, terms, and specifications subject to change without notice

© 1985 PC BRAND

CIRCLE 141 ON READER SERVICE CARD

ASTERN

ANY COMPARABLE ADVERTISED PRICE BY \$1

HAVE A HAPPY AND SAFE HOLIDAYS!

[illegible]

THE RIGHT NUMBERS!

AST Six Pak Plus™

w/384K **\$245**

Dynamics Plus

w/384K **\$139**

Both cards include Serial, Parallel,
Clock/Calendar, Ram disk, Spooler,
& Memory



Hercules MonoGraphics™

\$309

Dynamics MonoGraphics

\$159

Both cards display IBM compatible
monochrome graphics on a monochrome
monitor

AST Advantage™

w/128K **\$389**

Dynamics ATMF

w/128K **\$259**

Both cards include Serial, Parallel,
Ram disk, Spooler & Memory

IBM

IBM PC AT ENHANCED

- 20 meg Hard drive
- 512K RAM
- 1.2 MB Floppy Drive



\$3777

COMPAQ

286

- DESKPRO 256K, 1.2 MEG, 20 MEG HARD DRIVE **4495**
- PORTABLE 256K, 1.2 MEG, 20 MEG HARD DRIVE **4495**

PORTABLE

- 256K, 2-360K DRIVES **1949**
- 256K, 360K DRIVE, 10 MEG DRIVE **2449**

DESKPRO

- 640K, 360K DRIVE, 10 MEG DRIVE **2345**
- 640K, 360K DRIVE, 10 MEG DRIVE, 10 MEG TAPE DRIVE **2940**

All Models Available - C A L L

IBM

IBM PC



CALLS

For Latest Price

[We Have Your Custom Configuration]

Hard Disks

Fully DOS Compatible. Each system comes complete with Ready-to-Install Hard Disk, Cables, Controller, Manual, Software, and Mounting Hardware. 1 Year Warranty. Call for quote on larger hard disks.

10 Meg 20 Meg 30 Meg

\$369 \$489 \$675

...and More!

EPSON

FX 85 359

FX 185 489

LD 1500 621

HAYES

1200 289

1200B 269

CHIPS

34K 9

128K 39

256K 39

512K 119

8192K 199

ACCESSORIES

GENEAL SPECTRUM 319

TEAC 360K 85

AT 360K 119

POWER SUPPLY 59

125W 119

150W 119

PRINTER CABLE 25

AT SERIAL/PARALLEL 19

EXTERNAL BOX 159

TAPE DRIVES 549

10 MEG 799

20 MEG 899

1. Call

Just call our
Toll Free Number
and tell us
what you're interested in

2. Quote

Your
Professional Assistant
will find the supplier
with the **Lowest Price**.
We'll quote the
Fully Delivered Price.

3. Delivery

Since all in - stock, we'll
ship within 24 hours.

(Overnight at Additional Charge)

For fastest delivery, send
Cashier's Check, M.O., Wire
transfer or Credit Cards. No sur-
charge for MC/VISA AMEX and
Diner's Club at 2.5%. No tax except
Texas.

4. Guarantee

**Brand Name Products.
Best Price Guaranteed.**

All products carry at least
Manufacturers Warranty.
If it breaks, our technicians will
issue a return authorization. If
DOA, return for exchange. All
systems assembled and tested
before shipping.

(512) 836-5707

2201 Donley,

Suite 304

Austin, Texas 78758

1-800-535-3637

COMPUTER DYNAMICS INC.

IBM, IBM and COMPAQ are
registered trademarks of their respective companies.
© 1987 COMPUTER DYNAMICS, INC.
Printed in U.S.A. 10/87, REVISED 10/87
AD #5071

CIRCLE 490 ON READER SERVICE CARD

Why People Are Laughing At Lotus 1-2-3.

...And dBase III, and Wordstar and all the other popular programs. Introducing CHUCKLE POPS, the first program that lets you take a break from your computer, on your computer.

CHUCKLE POPS puts hundreds of the funniest jokes right at your fingertips. Just a simple key-stroke suspends any program and displays a hilarious joke on your screen. Read one. Read a few. You chuckle, you guffaw, you scream with laughter.

Beginning to attract too much attention? Another key-stroke returns you to where you were. Only now you're relaxed,

revitalized and ready to tackle any job. Thanks to CHUCKLE POPS, work has never been this much fun.

CHUCKLE POPS makes a great gift, too. It's backed by a 15 day money-back guarantee. And, at only **\$14.95**, even the price will make you smile.

So start laughing.

Order your copy
of CHUCKLE
POPS

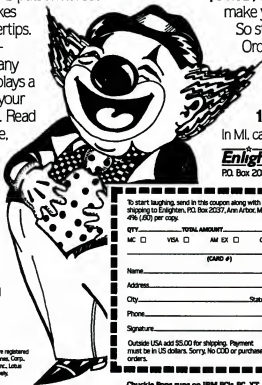
by calling

1-800-447-1771.

In MI, call 1-313-668-6678

Enlighten

P.O. Box 2037 Ann Arbor, MI 48106



IBM, Wordstar, dBase III, Lotus and 1-2-3 are registered trademarks of International Business Machines Corp., Micropro International Corp., Ashton-Tate, Inc., Lotus Development Corp. (LDC), and LDC respectively.

To start laughing, send in this coupon along with \$14.95 per copy plus \$2.00 for shipping to Enlighten, P.O. Box 2037, Ann Arbor, MI 48106. Michigan residents add 4% (.60) per copy.

QTY _____ TOTAL AMOUNT _____

MC ☐ VISA ☐ AM EX ☐ Check ☐ Money Order ☐

(CARD #) _____ (CDD DATE) _____

Name _____

Address _____

City _____ State _____ Zip _____

Phone _____

Signature _____

Outside USA add \$5.00 for shipping. Payment must be in US dollars. Sorry, No COD or purchase orders.



Break-time software

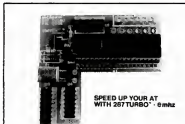
Chuckle Pops runs on IBM PCjr, PC, XT, AT and true compatibles.

MICROWAY'S 8087 RUNS 1-2-3™!

MicroWay is the world's leading retailer of 8087s and high performance PC upgrades. We stock a complete selection of 8087s that run at 5 and 8mhz. All of our coprocessors are shipped with a diagnostic disk and the best warranty in the business - one year! We also offer daughterboards for socketless computers such as the NEC PC and PCjr, and a board which increases the clock speed of the 80287 from 4 to 8 mhz. Our NUMBER SMASHER™ includes 512K ram. It will run the IBM PC at clock speeds up to 10mhz and achieves a throughput of .1 megaflops

with 87BASIC/INLINE, Intel Fortran, or Microsoft Fortran. Software reviewers consistently cite MicroWay software as the best in the industry! Our customers frequently write to thank us for recommending the correct software and hardware to meet their specific needs. They also thank us for our same day shipping! In addition to our own products which support the 8087 and 80287, we stock the largest supply of specialized software available anywhere. For information call us at

617-746-7341



SPEED UP YOUR AT
WITH 287 TURBO™ - 6 mhz

MicroWay® 8087 Support

For the IBM PC, PC XT, PC AT and Compatibles.

NUMBER SMASHER™ The World's Fastest Accelerator Card for the IBM PC, XT, and Compatibles! Includes an 8088 and 8087 pair tested to 10mhz, and 512K bytes of high speed ram. Compatible with all software, operating systems and hardware! Your program speed is increased by a factor of 2.5 to 4.0. Floating point programs run up to 2.8 times faster on the PC than on an 80287 equipped PC AT **\$1049**

MATRIXPAK™ manages a MEGABYTE! Written in assembly language, our runtime package accurately manipulates large matrices at very fast speeds. Includes matrix inversion and the solution of simultaneous linear equations. Callable from MS Fortran 3.3, 87MACRO, and 87BASIC/INLINE each **\$150**

87FFT™ Written in assembly language, performs Forward and Inverse FFTs on real and complex arrays which occupy up to 512K bytes of RAM. Also does convolutions, auto correlations, hemming, complex vector multiplication, and complex to real conversions. Callable from MS Fortran, 87MACRO, C, TURBO PASCAL or 87BASIC/INLINE **\$200**

87FFT-2™ performs two-dimensional FFTs. Ideal for image processing. Requires 87FFT **\$100**

GRAPHICS PACKAGES

Gratmatic for Fortran or Pascal **\$125**
Platmatic for Gratmatic **\$125**
Multi-Halo (one language) **\$189**

DFixer™ - Eliminates the AT hard disk problem! A disk which thoroughly checks PC or AT hard disks for bad sectors and updates the MS DOS file allocation table accordingly **\$149**

EPSILON™ - our favorite in-house editor lets you simultaneously edit up to 11 source files and concurrently run a compiler or linker. A real timesaver! **\$185**

87BASIC/INLINE™ converts the output of the IBM Basic Compiler into optimized 8087 inline code which executes up to seven times faster than 87BASIC. Supports separately compiled inline subroutines which are located in their own segments and can contain up to 64K bytes of code. This allows programs greater than 128K! Requires the IBM Basic Compiler and Macro Assembler. Includes 87BASIC **\$200**

87BASIC™ includes patches to the IBM Basic Compiler and both runtime libraries for USER TRANSPARENT 8087 support. Provides super fast performance for all numeric operations including trigonometrics, transcendental, addition, subtraction, multiplication, and division **\$150**

87MACRO/DEBUG™ - contains all the pieces needed for writing 8087/80287 assembly code including 8087 macros, object libraries for commonly used functions, including transcendental, trigonometric and conversions between strings and real numbers. Our 87DEBUG completes the package **\$199**

OBJ-ASM™ - a multipass object module translator and assembler. Produces assembly language listings which include public symbols, external symbols, and labels commented with cross references. Ideal for patching object modules for which source is not available **\$200**

RTOS - REAL TIME OPERATING SYSTEM RTOS is a multi-user, multi-tasking real time operating system. It includes a configured version of Intel's iRMX-86, LINK-86, LOC-86, LIB-86, OH-86, and MicroWay's 87DEBUG. Runs on the IBM PC, XT, PC-AT and COMPAQ **\$400**

INTEL COMPILERS!

FORTTRAN-86 **\$750**
PASCAL-86 **\$750**
PL/M-86 **\$500**
ASM-86 **\$200**

*Requires RTOS or iRMX-86. All Intel compiler names and iRMX-86 TM Intel Corp.

FASTBREAK™ MicroWay's software turns on your 8087 during 1-2-3™ execution. Recalculations run up to 36 times faster. When used with the NUMBER SMASHER™ it can provide a total increase in 1-2-3™ execution speed of up to 79 to 1. FASTBREAK provides you with the unique capability for running other programs on top of 1-2-3. These programs can be written in BASIC, PASCAL, Fortran or C and can access the current values in your 1-2-3 worksheet **\$79**

FASTBREAK & NUMBER SMASHER \$1099

8087 5mhz \$109
Including DIAGNOSTICS and one-year warranty for IBM PC and compatibles.

8087-3 5mhz \$175
For the Tandy 1200.

8087-2 8mhz \$175
For Wang, AT&T, DeskPro, NEC, Leading Edge

80287-3 5mhz \$199
For the IBM PC AT and Compaq DeskPro 286.

287Turbo™ 8 mhz \$395
With Reset Button and Diagnostics.

64K RAM Set \$8

256K RAM Set \$29

256K CMOS RAM Set \$39

128K RAM Set PC AT \$89

INTEL ABOVE BOARD CALL

JRAM-2™ (8K) \$189

JRAM™ AT (8K) \$229

JRAM-3™ (128K) \$275

MAYNARD ACCENT \$225

FORTRAN, C and BASIC

Microsoft Fortran Version 3.3 **\$229**
IBM Professional Fortran **\$45**
Ryan-McFarland Fortran **\$399**
FORLIB+ or STRINGS and THINGS **65**
Lattice C or Microsoft C Version 3.0 **299**
FLOAT87 **150**
IBM Basic Compiler Version 2.0 **445**
Microsoft Quick Basic **89**
Summit BetterBASIC **175**
True BASIC **105**

MACRO ASSEMBLERS

IBM Assembler with Librarian V.2.0 **155**
Microsoft Assembler Version 3.01 **125**

PASCAL and APL

Microsoft Pascal Version 3.3 **199**
Borland Turbo with 8087 Support **85**
STSC APL+PLUS/PC **450**
STATISTICS **595**
COSMOS Revelation **750**
Phoenix PLink86 **295**
SPSS/PC **595**

FASTBREAK and NUMBER SMASHER are trademarks of MicroWay, Inc. Lotus and 1-2-3 are trademarks of Lotus Development Corp.

European Customers: Please call MicroWay in London at 01-223-7662.

MicroWay

P.O. Box 79
Kingston, Mass.
02364 USA
(617) 746-7341

**The World Leader
in 8087 Support!**

Our new improvements on
Crosstalk XVI are ~~revolutionary~~ ~~colossal~~
~~sensational~~ ... too good to ignore entirely.



It's not easy to make big improvements to Crosstalk. So we keep making little ones. To some people, our latest improvements may seem minor. But they may be just what you've been waiting for.

If you need the KERMIT protocol, you'll be excited to hear that our new version of Crosstalk XVI has it. Now you can transfer files from PC to mainframe or back, with error-checking.

If you use TopView, you'll be happy to hear that our new version is compatible with it. You can now keep Crosstalk running while you use another program.

In all, our latest version of Crosstalk XVI has 30 improvements. Some minor. Some major.

If you already have an earlier version of Crosstalk, we'll update it for a modest additional charge.

If you use another data communications program that doesn't keep improving, maybe it's time you had an improvement of your own. Try Crosstalk, at your local retailer. Or write for details.

MICROSTUF

Microstuf, Inc.
1000 Holcomb Woods Pkwy.
Roswell, Georgia 30076



CROSSTALK[®]

XVI

CIRCLE 326 ON READER SERVICE

Designed for Excellence

with attention to etail

The critics agree: We're masters of our craft.

"...masterpiece of IBM imitation...minor masterpiece of the circuit designer's art...impressed by its high standards of quality and workmanship." Winn L. Rosch, Cloning Your Own PC, PC Magazine, July 10, 1984. ■ "The most compatible IBM clone I've ever worked with." Lee Konowe, American Software Club, Ridgefield Ct. ■ "Fulfills our every need...and leaves us money for software." John Glenn, Electrical Engineer, U.S. Navy.



MEGA-CASE™ \$79⁹⁵

Flip Top (requires a power supply with a switch in the rear)



MEGA-BOARD™ XT \$399⁹⁵

*Fully Assembled and Tested
—256K RAM*



POWER SUPPLY \$119⁹⁵

130 Watt • Rear Power Switch

Also Available:

Hard to Get Parts Kit—\$49.95
Discrete Kit—\$99.95
IC Kit—\$149.95
Mega-Board (bare)—\$89.95
(socketed)—\$199.95
Mega-Bios ROM—\$39.00
Keyboard—\$119.95

Call for a free catalog of
complete products
at new sale prices.



MEGA KIT™ Now Available at \$949⁹⁵

*Includes: Motherboard 256K • Case
• Power Supply, 130 W • Keyboard • Floppy
Controller • 2 Floppy Drives • Users Manual*

**MEGA-BOARD on
display at the following
locations:**

Electronic Projects Incorporated
30 Airport Blvd.
Mobile, Alabama 36608
(205) 342-4565

Hawaiian Industrial Instruments
1154 Fort Street Mall, Suite 200
Honolulu, Hawaii 96813
(808) 533-4312



IBM is a trademark of International Business Machines

Prices subject to change
without notice.

DTC™

**DISPLAY
TELECOMMUNICATIONS
CORPORATION**

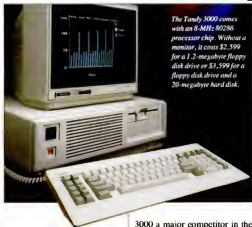
INTERFIRST PLACE • 8445 FREEPORT PARKWAY • SUITE 445 • IRVING, TEXAS 75063
PHONE: (214) 607-1382 OR (214) 991-1644 • TELEX: 510600176 DTC UD

CIRCLE 352 ON READER SERVICE CARD

PC News

NEWS IN BRIEF	38
COMMUNIQUEs	43
PC UPDATE	46
DOWNTIME	54

Tandy's 3000 Offers PC AT Compatibility



The Tandy 3000 comes with an 8-MHz 80286 processor chip. Without a monitor, it costs \$2,599 for a 1.2-megabyte floppy disk drive or \$3,599 for a floppy disk drive and a 20-megabyte hard disk.

BY BARBARA KRASNOFF
FORT WORTH, Tex.—The Tandy Corp. hopes its large dealer network and an attractive price will make the new Tandy

3000 a major competitor in the AT-compatible arena. The Tandy 3000 was announced at the Las Vegas COMDEX in late November, with immediate shipment scheduled.

According to a Tandy representative, AT users look for expansion capability and speed, so the 3000 was designed with that in mind. The basic unit features a 16-bit 80286 chip running at 8 MHz (versus the AT's 6 MHz), a standard 512K bytes of RAM, and a 1.2-megabyte floppy disk drive with or without a 20-megabyte internal hard disk. Tandy plans to offer a 40-megabyte hard disk in the first quarter of 1986. An internal bus affords easy installation of one to three drives: one floppy (360K bytes or 1.2 megabytes), one hard disk, and a third floppy or hard disk.

Lots of Slots

The Tandy 3000 also features seven AT-compatible expansion slots, two XT-compatible slots, and a half-slot. One full slot and the half-slot are filled in the machine's standard configuration. The half-slot holds the standard serial/parallel adapter.

Tandy will offer several ways in which to fill those empty expansion slot spaces, including a graphics card that supports the same high-resolution monitor as the company's Tandy 2000 hard disk computer. The empty expansion slots can also hold up

(continued on next page)

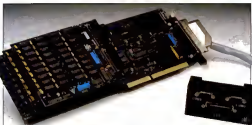
Quadram AT Memory Board Breaks 640K

The Quadboard-AT boosts power program access to 3.5 megabytes of RAM beyond the ordinary DOS limit.

BY WINN L. ROSCH

NORCROSS, Ga.—The new Quadboard-AT from Quadram Corp. promises more than other AT multifunction boards—not just more memory but more useful memory. While most current

(continued on next page)



The \$595 Quadboard-AT multifunction board has two serial ports, one parallel port and 1.5 megabytes in one slot—expandable up to 3.5 megabytes in 1½ slots.

Special Show Report

PC News covers Localnet '85 to observe firsthand the industry reaction to IBM's mid-October token-ring network announcement (*PC Magazine*, Volume 4 Number 25, page 33). Clearly, IBM opened a software compatibility path with NETBIOS and the ACCP network interface. And following Big Blue's lead, a spate of token-ring products were spotlighted at the show. For a full update, see page 51.

Quadram AT Board

(continued from preceding page)

AT multifunction boards only add RAM that few software programs are able to take advantage of, the Quadboard-AT will give programs like the latest versions of *Framework*, *1-2-3*, and *Symphony* access to up to 3.5 megabytes of data storage beyond the ordinary 640K-byte DOS limit.

The Quadboard-AT board puts its memory to use by following the Lotus/Intel/Microsoft expanded memory specification (EMS). It ranks among the first products to give that ability to the AT; only the Orchid Technology AT multifunction board preceded it.

Other AT expansion products use "extended" memory, which is addressable only through the 80286 microprocessor's protected mode, a feature not currently supported by DOS. Although the protected mode does allow the AT to handle up to 16 megabytes of total memory, DOS and nearly all available PC programs stop counting at 640K bytes. In fact, the only popular software to make use of the AT's extended, protected-mode memory area is the VDISK disk emulator that is

supplied with DOS.

More Data Storage

Thus, the Quadboard-AT ties together the speed of the AT with the useful memory abilities of EMS. Traditionally, EMS has been the realm of the PC and XT alone—the standard having been created to add extra life to those machines by making them more competitive with the AT. While EMS adds to the available data storage area for programs that have been specially

can be split (at the user's option) between filling the DOS 640K-byte quota, the EMS expanded memory, and the AT's protected-mode extended memory.

With two daughtercards, the Quadboard-AT requires 1½ expansion slots. The half-slot adjacent to the main Quadboard card is free for the installation of any short expansion board.

The Quadboard-AT's EMS abilities, extra serial port, and low price give it an edge over its less-endowed competition.

The Quadboard-AT packs two serial ports, a parallel port, and up to 1.5 megabytes in 256K-bit chips. Up to two daughtercards, each with 1 megabyte, can be stacked for up to 3.5 megabytes.

written to its specifications, by itself EMS does nothing to increase the computing speed or program performance.

The Quadboard-AT packs two serial ports, a parallel port, and up to 1.5 megabytes in 256K-bit chips. Up to two daughtercards, each with 1 megabyte, can be stacked for additional storage up to 3.5 megabytes. This total memory

With 512K bytes of RAM, the Quadboard-AT retails at \$595; the 1.5-megabyte version sells for \$2,295. Daughtercards with no memory are priced at \$285; with 1 megabyte, \$915. *PolyWindows DeskPlus*, a memory-resident utility is also bundled with the Quadboard-AT. Both the Quadboard-AT and the daughtercards have a November 20 ship date. ■

Tandy's 3000

(continued from preceding page)

to 15 megabytes of machine memory.

No Operating System

An interesting quirk in Tandy's marketing scheme is that the machine is being sold without an operating system. Tandy is offering an MS-DOS 3.1 package that includes *Basic* and *Desk Mate* integrated software as an optional system. Tandy also intends to market XENIX 5.0 (again with *Desk Mate*) as an alternative. XENIX 5.0, which is expected to be released in March 1986, should support up to six users using a four-user board with a built-in microprocessor and memory.

The Tandy 3000 will be selling at \$2,599 for the standard machine with a 1.2-megabyte floppy disk drive and at \$3,599 for the same machine with an added 20-megabyte hard disk.

Tandy hopes that these prices, along with the 3000's flexible configurations and the company's widespread customer support through its Radio Shack chain, will put the model 3000 ahead of the competition. ■

IBM's Wheelprinter E— Near the Head of Its Class

FIRST LOOK

Big Blue tightens the class competition with its new low-end daisywheel printer.

BY M. DAVID STONE

IBM is taking on the low-end printer market with a vengeance. First, it introduced the \$549 Proprietary, which redefined the low-cost dot matrix printer market. Now the company comes out with the 16-character-per-second, \$699 Wheel-

printer E, an equally impressive price and performance competitor for the low-end daisy wheel

market.

The Wheelprinter E scores high marks on nearly every



The IBM Wheelprinter E daisy-wheel printer quietly generates 17.5 characters per second. The Wheelprinter E retails for \$699, plus an additional \$350 for the new Wheelprinter family sheet feeder.

standard measure of printer performance. Its output is true Selectric quality. While some fully formed character printers in this price range compromise on print quality, the Wheelprinter E produces some of the best-looking letter-quality output available at any price on the market.

The Wheelprinter E is quieter than most printers, so much so that IBM doesn't even bother with providing a noise reduction cover over the print mechanism of the machine.

Acceptable Speed

The PC Magazine Labs speed test clocked the printer at 17.5 cps—a tad faster than the 16 cps IBM claims. This speed is acceptable, though it falls 2 to 3 cps short of matching the fastest printers in the \$600-to-\$800 price range.

Paper insertion is nearly automatic on the Wheelprinter E. Pressing a front-panel square

Hewlett-Packard's Vectra Beats The PC AT On Speed, Size, and Price

FIRST LOOK

Hewlett-Packard's latest microcomputer tests the AT's mettle on all accounts.

BY CRAIG L. STARK

NEW YORK—The code name for Hewlett-Packard's recently introduced Vectra microcomputer is 30-30-30 because it claims to be 30 percent faster, 30 percent smaller, and 30 percent lighter than the IBM PC AT. It's also priced 20 percent less than the industry leader.

While our detailed verification of its performance claims must await full-scale testing in PC Magazine Labs, an 11-second rating on our prime-number benchmark test (compared to 15 seconds for the AT) supported our favorable first impression of the Vectra's speed.

The Vectra's 80286 CPU has

a clock speed of 8 MHz. Its optional 80287 coprocessor runs at 5.33 MHz, and, unlike the one in the AT, uses the full 16-bit data path—which should make for an even more impressive number-crunching speed. Although the Vectra's desk footprint is only 16½ by 15½ inches versus the AT's 21- by 16½-inch frame, the machine contains seven full-length eard slots (five of which support the 16-bit IBM bus) and a 190-watt power supply.

Our sample came in a typical AT configuration that had a 20-megabyte hard disk from Seagate Technology (not as fast as the AT disk), both a 1.2-megabyte and a 360K-byte 5¼-inch floppy from Panasonic, 640K bytes of built-in RAM, an HP keyboard, and an HP 640- by 400-pixel color/graphics monitor. The unit includes both serial and parallel ports as well as both color and monochrome adapter boards; the latter is designed for standard 60-Hz (not IBM 50-Hz) monochrome screens.

The Vectra configuration

sold for office use bundles a *Program Application Manager*, Microsoft GWBASIC, MS-DOS 3.1, and *AdvanceWrite III*, a word processing program developed jointly with Samna



Vectra is Hewlett-Packard's first fully IBM-compatible PC. Most operations are faster than the AT, and the keyboard has separate arrow and number keys.

Corp. The whole package comes to a respectable \$7,210, while the entry-level model is listed at \$3,199.

With the Vectra, HP has acknowledged that in the corpo-

rate world, full compatibility with IBM software and peripherals has become a *sine qua non*. The Vectra's IBM BIOS emulation is from Phoenix Software, and it appears to be complete, right down to running *Jet* and *Flight Simulator* as well as *dBASE II* and *1-2-3*. Even *XYWrite II Plus*, our office word processing system ran without a hitch.

The color monitor is an analog unit capable of receiving digital signals and converting them to analog. It can display 4,096 colors, given suitable software. Its sweep rate is 25 kHz, which gives it a crisp display suitable for word and data processing. The only caveat about the color monitor is that while it can display both IBM color graphics and text, the display is vertically stretched by about 15 percent.

The HP keyboard supplied with the Vectra has a reasonably positive feel and proper overtravel, although it lacks the IBM "click." By way of compensation, however, it includes both a numeric keypad and a set of cursor-control keys that anyone who must enter large amounts of numerical data will more than welcome.

lifts the bail, rolls in a sheet of paper just far enough to print on the first line, and then automatically closes the bail on the paper after advancing several more lines.

The Wheelprinter E is billed as the low-cost alternative to the \$1,495 Wheelprinter.

The Wheelprinter E has a selection of more than 44 printwheels available for its use. In addition, it uses the same printwheels and ribbons as the IBM Wheelwriter typewriters and the IBM Wheelprinter.

Impressive Sheet Feeder

The Wheelprinter E is billed as the low-cost alternative to the \$1,495 Wheelprinter, its 25-cps sibling. The \$350 Wheelprinter family sheet feeder and the \$75

tractor are standard on the Wheelprinter. However, both of these accessories are optional on the Wheelprinter E.

The sheet feeder is one of the best around and well worth the price. Together with the printer, it offers a complete, letter-quality printer system for just \$1,049. That's a combination of price and performance that will be hard to beat, especially with those three magic letters on its cover.

Wheelprinter E

IBM Information

Systems Group

900 King St.

Rye Brook, NY 10573

(800) IBM-2468

List Price: \$699; Single-

bin sheet feeder, \$350;

Tractor, \$75; Printwheels,

\$25.25; Ribbons: single-

strike carbon, \$8.70;

multistrike mylar, \$13.25;

multistrike fabric, \$14.75.

New BIOS Slows AT

BY VIRGINIA DUDEK

The new ROM BIOS chip in the IBM PC AT, equipped with an IBM-manufactured 30-megabyte hard disk (see "IBM Offers New, Larger PC AT," *PC Magazine*, Volume 4, Number 24, page 33), now limits the AT to a factory-authorized 6-MHz microprocessor speed.

Previously, users could replace the AT's crystal with a non-IBM crystal for \$15 to \$50 and boost the 80286's speed by a third, from 6 to 8 MHz. The crystal governs how fast the microprocessor runs.

Block that Chip

But IBM blocked that option by altering the ROM BIOS included with 30-megabyte ATs and 30-megabyte AT upgrade kits. The new BIOS code refuses

to recognize speed settings beyond the IBM-approved 6 MHz.

"The AT was tested and built as a 6-MHz machine," explained IBM spokesperson Rob Wilson.

IBM's new BIOS code refuses to recognize settings beyond 6 Mhz.

"We have not tested the machine beyond that, and we believe that higher speeds could yield unreliable results."

However, PC Magazine Labs has tested ATs running at 8 MHz with no reliability problems. (See "Making Fast Faster," *PC Magazine*, Volume 4, Number 23, page 136). Other makers, such as COMPAQ, sell AT compatibles that run normally at 8 MHz using the 80286.

Contact us for other low prices on hardware and software.
Next Day Air Extra

FREE SHIPPING
NO SURCHARGE FOR  **OR** 
Call for latest prices.

20 and 33 MEG INTERNAL AND EXTERNAL HARD DISK SYSTEMS

	20 MEG	33 MEG
Internal	\$495	\$929
External	\$645	\$1029

Externals mounted with independent power supply and fan. Fully DOS 2.X or 3.X compatible. Both Internals and Externals boot from Hard Disk. 33 Meg Internal Disks include external power supply. The system comes complete and ready to install with the Hard Disk, Controller, Cables, Manual, Software, and Mounting Hardware. One Year Warranty.



Half Height



20 and 33 Meg Hard Disks are available with combined Floppy/Hard Disk Controller Card for additional \$75.

COMPAQ

**256K, 1/360K drive,
10 Meg Internal**

Functional equivalent
to a Compaq Plus™



\$2549

Now using 3 1/2" shock-mounted Winchester drives. The same as used in the Compaq Plus™. Also available with 2 half-height drives and 10 MEG HD- **\$2749**

Or upgrade your Compaq to a Compaq Plus™ equivalent with our 3 1/2" shock-mounted Winchester disk kit. Includes Hard Disk, Controller, Cables, Manual, software, and Mounting Hardware. One year warranty. **\$519**

Compaq is a registered trademark and Compaq Plus and Compaq Disk are trademarks of Compaq Computer Corporation.

DISK DRIVES

TEAC

11-B, Half-Height, DVDD

\$95



MITSUBISHI
Half-Height, DVDD

\$85

Quantities of 10 or more
\$75 each

Call us for competitive prices on larger quantities of RAM chips.

64K RAM

Set of 9 chips, 200 or 150 Nanoseconds

\$8

Quantities of 100 or more sets

\$4⁵⁰
per set.

256K RAM

Set of 9 chips

\$39

\$29

Quantities of 50 or more sets

per set.

80386: Chip of the Future? . . . Intel Corp. calls its new 80386 chip the highest-performance general-purpose commercial microprocessor in existence and expects computer users to have access to this new power by early 1986.

The 80286-based PC AT debuted 2 years after the 80286, but a personal computer based around an 80386 chip should be here sooner than that. While the \$299 80386 chip is \$61 cheaper than the 80286, the need for supporting architecture stands in the way of its immediate use as an add-on product. IBM Entry Systems Division president William C. Lowe called the 80386 "a significant technical accomplishment." He adds, "Its use in an IBM PC product is not expected in the immediate future."

Gary Stimac, director of engineering for COMPAQ, says that a boost in memory, clock time, and an accommodation to the 32-bit bus would be needed to take full advantage of the new chip's computing potential. However, Intel's acknowledged intention in demonstrating the 80386-based AT was to show compatibility, not speed.

"I'm not sure we'd incorporate it in a board product," says Tony Paradiso, senior product manager at AST Research Inc. in Irvine, Calif. He also questions Intel's time projection saying, "I wouldn't expect the chip to be on the market until late next year or early 1987."

—Charles Bermant

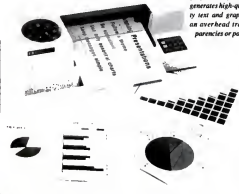
Output Devices from Hewlett-Packard . . . A new printer and a new plotter have been announced by Hewlett-Packard Co. The HP 2603A daisy-wheel printer and the HP ColorPro plotter (model HP 7440) are IBM compatible and run on most personal computers, including AT&T, COMPAQ, and HP models.

The \$1,495 HP 2603A daisy-wheel printer prints 48 characters per second, features nine fonts (including 10-, 12-, and 15-pitch) on drop-in printwheels, proportional spacing, and supports international languages. HP includes a sound-damping carpet with the printer, which brings the noise level down to 58.5 decibels.

The HP 2603A printer uses the \$845 HP 26030E triple-bin sheet feeder, which can handle a combination of paper and envelopes.

Hewlett-Packard's \$1,295 eight-pen HP ColorPro plotter has a .001-inch resolution, which the manufacturer claims allows more effective plotting of solid areas of color and continuous straight lines on overhead transparencies or paper. The pens move at 15.7 inches per second and are automatically capped when returned to the carousel.

The \$1,295 HP 7440 ColorPro plotter, combined with a PC and graphics software, generates high-quality text and graphics on overhead transparencies or paper.



The ColorPro features Hewlett-Packard's HP-GL programming language, the de facto plotter language standard. Most software—including 1-2-3, Symphony, Microsoft Chart, Chart-Master, and Sign-Master—is designed to be compatible with the ColorPro.

Bridging PC Graphics with Enhanced VDI

. . . **Graphic Software Systems** has announced GSS*CGI, a device-independent computer graphics interface (CGI) for raster and vector graphics. GSS*CGI is a new implementation of GSS's virtual device interface (VDI) standard. The GSS*CGI acts as a link between a program and output or input devices such as plotters, monitors, and mice.

The company says its GSS*CGI is more flexible than other VDI device drivers because it provides bit-mapped graphics management, eliminating the time-consuming need for program developers to create their own device drivers. The GSS*CGI driver is simply added to the applications package.

Hardware manufacturers will benefit if software developers create device-independent graphics applications, GSS says, because the software does not have to be machine-specific. It will run on any hardware equipped with the VDI.

A single copy of GSS*CGI costs \$175; however, the price is under \$50 when purchased in OEM quantities. GSS is located at 9590 S.W. Gemini Dr., Beaverton, OR 97005, (503) 682-1606.

Three New Orchid Boards . . . A new line of multi-

function memory boards—all designed with the Lotus/Intel/Micro-soft expanded memory specification (EMS)—have been introduced by Orchid Technology Inc. CramRAM and Conquest increase the memory capacity of the PC and XT, while ECCELL introduces an error-correcting capability to the AT.

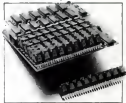
The Conquest board for the PC, XT, and compatibles can replace up to three ordinary boards by itself, according to Orchid. Conquest, which has an optional PCnet (local area network) adapter board that won't take up a second slot on the PC, has a 2-megabyte memory capacity and costs \$395. A 150-nanosecond, nine-chip, 256K-byte set costs \$95.

The \$395 CramRAM for the PC, XT, or Portable PC shoehorns up to 2 megabytes of RAM onto a short slot using surface-mounted technology memory chips.

Orchid's expansion board for the AT, ECCELL, has an error-correction code that continually detects and corrects all memory errors before any data is either lost, damaged, or destroyed. This helps protect the AT from crashing because of memory failure. ECCELL has a total memory capacity of 3 megabytes per board; 1 megabyte on the main board and 2 megabytes on the daughterboard. Up to four boards can be added per system. A 1-megabyte capacity ECCELL board costs \$595. Optional daughterboards that cost \$145 each can add either one serial port, one parallel port, or dual serial ports.

All three boards feature Orchid's productivity features, such as disk caching, a high-capacity RAMdisk, and print spooling. Before EMS, the PC's RAM memory was limited to 640K bytes by DOS, but these new boards increase memory capability to the megabyte range.

For more information about these and other products, contact Orchid Technology located at 47790 Westinghouse Dr., Freemont, CA 94539, (415) 490-8586.



Orchid Technology Inc.'s CramRAM multifunction memory board is compact enough to fit in a short slot. The board has a 2-megabyte capacity and costs \$395.

THE ACCENT™ IS ON EXPANDED MEMORY... WITH MAYNARD'S NEW LOTUS-COMPATIBLE CARD!



Now, Maynard gives you 2MB of Lotus-compatible Expanded Memory with Accent™. Designed expressly for your personal computer, Accent™ adds memory power to Lotus 1-2-3®, Symphony® and all other Expanded Memory programs so you can create larger spreadsheets than ever! An optional mouse places speed, access, and customized commands at your fingertips, saving time and eliminating inconvenient, multi-key cursor controls. Accent™ is available at the finest computer retail stores everywhere. Contact your local dealer or write to us today for product information.

*Lotus 1-2-3 and Symphony are trademarks of Lotus Development Corporation.

Accent
Expanded Memory for Lotus® Personal Computers



Maynard Electronics
Shaping tomorrow's technology.

430 E. SEMORAN BLVD., CASSELBERRY, FL 32707 305/331-6402

CIRCLE 47 ON READER SERVICE CARD

Microsoft Makes A Better Mouse

BY JOHN DICKINSON

Just picking the new Microsoft Mouse up out of its box will convince you that it is an improvement over previous models. Version 5.0 is smoother and quieter, and its two wraparound buttons extend from the top of its body down to its rubber base.

Microsoft claims the new model doubles the resolution of its older model and other competitive mice. And the improvements don't stop there. For example, with *Microsoft Word*, you no longer have to lift the mouse off the desk in order to move from one side of the screen to the other.

All this speed comes with increased comfort. The rubberized control ball and Teflon runner move smoothly and in virtual silence. Although Microsoft's mouse products have never required a special

surface, users of the older model often complained about the trucklike sounds emanating from the steel ball and runners as well as the possibility of scratching the surface on which they moved. Those complaints have now been resolved.

As with previous Microsoft

mice, the new model comes in serial and bus (parallel) models to accommodate any hardware configuration. There is no difference in speed between the two models. The serial mouse is attractive because most people have the extra serial port available, and Microsoft's mouse doesn't require the extra power source. The bus mouse is priced lower, comes with its own bus card, and doesn't require an extra power source, either. But it does require that you give up a slot.



Microsoft's upgraded mouse, Version 5.0, (left) boasts better resolution than its earlier model (right) and wraparound buttons. Its serial and bus (parallel) versions, with the adapter cable shown above, are \$195 and \$175, respectively.

The revised mouse comes with mouse driver software (Version 5.0), productivity applications such as *Microsoft Notepad* and *PC Paintbrush*, an improved mouse menu program for creating your favorite applications, and prewritten menus for 1-2-3 and WordStar.

The Microsoft Mouse is compatible with *Microsoft Windows*, IBM's *Top View*, Digital Research's *GEM*, and other applications designed to use mice. The company claims its upgraded mouse will not make any current mouse-based applications obsolete.

Microsoft Mouse Version 5.0

Microsoft Corp.
10700 Northup Way
Bellevue, WA 98009
(800) 426-9400
(206) 828-8080
List Price: \$175.00, bus; \$195, serial.
Requires: 64K RAM (*PC Paintbrush*, 320K RAM), DOS 2.0, serial port or PC expansion slot (bus version).

PC ADVISOR EDITED BY GUS VENDITTO

To Play upon a PC

I am interested in musical synthesis. Is there any hardware/software to expand the small sound capabilities of the PC?

Ruben Alvarez
Miami, Florida

It's not really fair to coll the PC's sound capabilities small. A PC can produce sounds for higher than your ears can hear: It can produce all frequencies between 37 and 37,267 MHz; the human ear can hear only in the range of 20 to 20,000 MHz. The only serious limitation is that the PC can play just one note at a time. (It's possible to play three notes so quickly it may sound like a chord, but you can't create a real chord. A PCjr., however, can play up to three notes at once.)

What really stands between your PC and beautiful music is good amplification. If you've ever ripped out the tiny speakers in your car and replaced them,

PC Advisor is a regular feature that helps readers choose the best hardware and software to enhance their productivity.

you know how important speaker quality is to good sound. The first thing you could do is replace your PC's speakers. Radio Shack outlets offer good kits, but beware, this will invalidate your warranty.

What would you play? Music that you wrote? Unless you can program well enough to compose in BASIC or C, you'll need software. Music Construction Set from Electronic Arts (San Mateo, CA 94403; (415) 571-7171; list price, \$39.95) is a musical note processor that is easy to use.

But if you're truly serious about music, the only way to upgrade is with MIDI (Musical Instrument Digital Interface) hardware and software; MIDI is a standard for the transmis-

sion of musical notes that operates much the way ASCII does for words and numbers. The Roland Corp. (Los Angeles, CA 90040; (213) 685-5141) is the leader in the field for hardware. Their interface devices allow a PC to program or record music played on any synthesizer that conforms to the MIDI standard.

Roland's MPU-401 will run you \$310 for an expansion card and the interface box that allows input to and output from your synthesizer. You could compose your masterpiece in virtually any PC language, although C and assembly language are recommended for the power you'll need.

Special software is available for those who would prefer to spend their time writing melo-

diest, not code. Roland's MPS (Music Processing System) software (list price, \$495) allows you to compose, record, and edit. Texture (Cherry Lane Technologies, Port Chester, NY 10573; (914) 937-8601; list price, \$199) is a simpler program for composing.

A complete review of MIDI software is under way in the PC Magazine Labs; you'll see a report in a spring '86 issue.

Spare Parts

I have an IBM monochrome monitor with a faulty diode. I am not interested in buying the entire board just for one bad diode. Help me locate a source of parts for the PC.

Robert M. Christie
Spring, Texas

You won't even need a computer store for that sort of part. Any electrical supply outlet (or TV repair shop) is likely to have the diode or an adequate substitute.

Borland Introduces Reflex, The Greatest Analytical Tool Since The Couch

INTRODUCING REFLEX, THE ANALYST.

If you use Lotus 1-2-3™, dBASE® or PFS File™, you need Reflex™—because it's a totally new way to look at your data. It shows you patterns, relationships and interrelationships you didn't know were there, because they were hidden in data and numbers.

Reflex is the first database that separates the trees from the forest. The first database that understands that what you see depends on how you look at it.

The first database that probes relationships—then shows them to you in various graphic forms—scatter, line, bar, stacked bar and pie charts.

The first database to break the bonds of traditional DBMS (Data Base Management Systems) and give a dramatic visual turn to data analysis.

Reflex makes graphic leaps far beyond 1-2-3. With Reflex, when you look, you see.

HOW THE CRITICS REACT TO REFLEX

"The next generation of software has officially arrived."

Peter Norton, PC Week

"Reflex is one of the most powerful database programs on the market. Its multiple views, interactive windows and graphics, great report writer, pull-down menus and cross tabulation make this one of the best programs we have seen in a long time. The program is easy to use and not intimidating to the novice. Reflex not only handles the usual database functions such as sorting and searching, but also 'what if' analysis and statistical analysis. It can create interactive graphics with the graphics module. The separate report module is one of the best we've ever seen."

Marc Stern, InfoWorld

"What you see, then, is an interesting hybrid of a database and a spreadsheet that is ideal for analyzing tabular data."

Adam B. Green, InfoWorld

"More flexible than spreadsheets, this easy-to-use database training package presents information with visual clarity. Reflex is for you. The flexibility of switching between different views of the data lets you see relationships you may have previously overlooked. Without 'what if' analysis, key variables—such as cost of goods sold or travel expenses—may be out of hand but unaccounted. The type of analysis in Reflex is a noble endeavor to do on a spreadsheet, yet, it may mean the difference between success and failure in a competitive situation."

Ira K. Krahov, Business Computer Systems

REFLEX OPENS MULTIPLE WINDOWS WITH NEW VIEWS AND GRAPHIC INSIGHTS.

You use Reflex's Form View to build your database; the List View lets you put data in tabular list form; the Graph View gives you instant interactive graphic representations; the CrosTab View gives you amazing "cross-referenced" pictures of the links and relationships hidden in your data. Report View allows you to import and export data to and from Reflex, 1-2-3, dBASE, PFS File and other applications and prints out information in the formats you want. In fact, Report View is probably the best 1-2-3 report generator you can buy today. It's also the cheapest—and you're getting all the other features free.

The commands for all five Views are consistent—so you're not stuck learning five different ways to get something done. And because Reflex uses advanced windowing techniques, you can see several views on the screen at the same time—without having to switch back and forth. You get the picture—and the pictures—all at once—if that's the way you want to look at things.

Modify a number and all your Views—List, Form and Graph—are immediately updated, on-screen. Changing a number changes the picture—which is mighty handy when you're analyzing (let's say) sales figures by salesperson; or you're in "What If?" country asking yourself "What if we could add 2.5% in January sales?" "Show me."

"Give me the picture." "Show me what happens when we shift 11% of Nebraska's inventory to the new store in Hawaii."

"Show me how many Gizmo 28's we have in every store in every state as of midnight last night and what happens to our East Coast stocks if the shipping strike lasts more than a week." "Show me."

So Reflex shows you. Instant answers. Instant pictures. Instant analysis. Instant understanding.

HOW IN THE WORLD CAN BORLAND SELL A PHENOMENAL PRODUCT LIKE REFLEX FOR ONLY \$99.95?

At \$495.00, Analytica's original price, Reflex was a bargain. Acclaimed by critics and praised by users, Reflex also got our attention at Borland International. We were so impressed by Reflex that we bought the company!

To celebrate that, we're making business software history by offering Reflex—FOR A LIMITED TIME—for ONLY \$99.95! (Offer good through March 31, 1986).

That's \$395.05 off the original price—which is a pretty good return on your toll-free phone call.

We think Reflex should be an "automatic product," a "standard" that every PC owner should own. That's why we priced it at \$99.95. Naturally we've added our 60-day money-back guarantee and Borland's Reflex is not copy protected.



BORLAND
INTERNATIONAL

4401 Santa Valley Drive Santa Valley CA 95066
Phone (408) 438-8400 Sales 1712375

Trademark: Reflex is a trademark of BORLAND International Inc. Lotus is a registered trademark and Lotus 1-2-3 is a trademark of Lotus Development Corporation. dBASE is a registered trademark of Ashton-Tate, PFS is a registered trademark of PFS Inc. is a trademark of Software Publishing Corporation. IBM PC, XT, AT, PC DOS and IBM Corp. logos are registered trademarks of International Business Machines Corporation. Analytica International (InfoWorld) is a trademark of Personal Computer Technology.

CIRCLE 147 ON READER SERVICE CARD

REFLEX THE ANALYST™

To order by Credit Card call (800) 255-8008, CA (800) 742-1133
Available at better dealers nationwide. Call (800) 556-2283 for the dealer nearest you.

YES! Rush Reflex to me.
Send me _____ copies

System requirements:
Hardware: XT, AT and compatibles, 512K RAM minimum, IBM Corp. graphics adapter, Hercules Microchannel Graphics Card™ or equivalent, PC DOS 2.0 or greater hard disk and mouse optional.

Name _____
Shipping Address _____
City _____
State _____ Zip _____
Telephone _____

**60-DAY
MONEY-BACK
GUARANTEE**

\$99.95

This price includes shipping to all U.S. sites. All foreign orders add \$10 per product ordered.

Subtotal _____
 ICA res. add \$6 tax per credit _____
 Amount Enclosed _____
 Payment VISA MC BankCard Check _____
 Credit Card Exp. Date _____
 Card # _____
 Exp. Date _____

COD and Purchase Orders WILL NOT be accepted by Borland. California residents add 4% sales tax. Outside USA add \$10 and make payment by bank draft. payable to US dollar value on a US dollar bill.

Copyright 1985 Borland International Inc. 100-2-A

IN THE SPIRIT OF THE SEASON, VERBATIM® DATALIFE® GIVES YOU A FREE CALCULATOR IN EVERY TEN-PACK.



This holiday season, the leading manufacturer of flexible disks is giving you something more. For a limited time, Verbatim is packing a high-quality calculator — absolutely free — in every specially-marked box of Verbatim DataLife flexible disks.* This handy, credit card-sized calculator features an 8-digit LCD display, an independent memory system, automatic shut-off, and a protective carrying case. And it's backed by a one-year warranty.

It's easy to figure why the Verbatim Holiday Pack makes a wonderful present for your friends, your family — or even for yourself. But the holidays are coming up soon, and calculator supplies are limited, so don't wait. Hurry to your favorite computer store right away, and get your free calculator in specially-marked ten-packs of high-quality Verbatim DataLife disks. And get in the spirit of holiday gift-giving — with Verbatim.

VERBATIM
MORE THAN EVER,
YOU CAN COUNT ON US.

Playboy's Oki-Mate of the Month

What kind of man reads *Playboy*? If we're to draw conclusions from the pages of Hugh Hefner's publication, then the man who reads *Playboy* enjoys German cars, French wine, California styles, and, apparently, Japanese printer jokes.

Playboy's Party Jokes page on the back of the centerfold had definitions from the "Komputa Sutra" in its November issue.

The only printable definition was "Okidata," explained by

Playboy as "What Steinbeck needed to write the *Grapes of Wrath*."



Such a Good Idea, We'll Make It Our Own

Imitation may be the sincerest form of flattery, but no one's flattered at Microstuf. SoftKlone Distributing Corp. of Tallahassee, Fla., announced a \$49.95 "CROSSTALK XVI clone" called *Mirror* that "exhibits all the visual and functional characteristics" of Microstuf's best-selling \$195 communications package.

The status screen of the two programs mirror each other except for the word *Mirror* in place of *CROSSTALK XVI*. SoftKlone (1210 E. Park Ave.,

Tallahassee, FL 32301; (904) 878-8564) says *Mirror* also has the same user interface and feature/command structure.

One other thing SoftKlone may want to duplicate is Microstuf's battery of lawyers. Microstuf spokesman Stan Hays says *Mirror*, as described, "sounds very inflammatory." However, Hays says Microstuf will defer action, if any, until seeing a copy of the program.

Outright imitations of best-selling programs are rare but not unheard of, though many programs have similar features. For instance, *NewWord* is similar but not identical to *WordStar*. ■

Trapper John, PC?

Housecall '86 isn't a remake of the Walter Matthau/Glenda Jackson movie. It's a \$79 medical encyclopedia for the PC created by Rocky Mountain Medical Corp. (15680 S. Syracuse Circle, Greenwood Village, CO 80111; (800) 233-3556) or (303) 773-1237).

Housecall '86 covers 400 physical and psychological conditions, including: gas, AIDS, herpes, childbirth, eyestrain, wife and child abuse, common

colds, nose picking, frostbite, dog bites, growing pains, gray hair, hair loss (usual treatment: toupee), and black hairy tongue.

The *Housecall '86* user can describe symptoms before viewing a suggested diagnosis or go directly to one of the 400 conditions via the program's index.

One of the 400 topics: "extra fingers." Some might consider this a malady, but it may be just the thing for taming the PC's unwieldy Alt key. ■

Cache and Carry

Computer Scooter of New York City has answered the prayers of computer nerds who yesterday only dreamed of acquiring a natche.

The Disk Cache (even the name is French) is made up of two handcrafted leather pouches lined with multilayer, antistatic mylar and joined together by a leather band. Designed to fold in half and fit into any briefcase, Disk Cache can also flap over a trouser belt, rendering the all-important nerd calculator case passé. It can shield 16 disks and comes in black, brown, burgundy, and

taupe. Lead-lined models are also available.

Disk Cache sells for \$89 and comes with ten free disks. In addition, monogrammed initials or corporate logos can be imprinted in 22-carat gold. Contact Computer Scooter at (212) 206-0053. ■



Why Did the PC Cross the Road?

Too much computer software turns out to be a joke. Enlighten's *Chuckie Pops* is a deliberate joke—500 of them in a memory-resident program invoked à la *SideKick*.

For \$14.95, *Chuckie Pops* is cheaper than a running addiction to Ma Bell's Dial-A-Joke, but not much better.

Some examples:

"Two men in the garment district in New York were talking. 'So how's business?' the first man asked. 'Not so good,' the other man replied. 'It looks like a sure-fire proposition.'"

"Did you hear about the scientist who was experimenting with rats? He switched to lawyers so he wouldn't form an emotional attachment."

"A centenarian's advice on

how to live to be a hundred: Get to the age of 99 and be very, very careful."

The *Chuckie Pops* text files are encoded so you can't add jokes. Enlighten's president, Steve Glaubman of Ann Arbor, Mich., fears users might add



distasteful or racist jokes that would sully Enlighten's reputation—notwithstanding that many of the *Chuckie Pops* knee-slappers are reshaped ethnic jokes with the words *Polish*, *Jewish*, *Italian*, and *black* chopped out.

Glaubman says future versions might address special vertical (read: dirty) markets. For information, call (800) 447-1771.

PC Magazine's favorite:

A father was discussing business ethics with his son who had just graduated college. "Suppose a woman came into the store," the father began, "and bought \$100 worth of goods. As she is walking out the door, you discover she's given you two \$100 bills instead of one. So here's the ethics question: Should you or shouldn't you tell your business partner?" ■

Contributions Welcome

Contributors to the Communications page included Charles Bermant, Virginia Dudek, Chris Johnston, and Paul Somerson.

If you've heard something offbeat about the computer world, send us your story. In return, we'll send you \$50 if we use it. Write: Communiqués, PC Magazine, One Park Avenue, New York, NY 10016 or MCI Mail 157-9301. ■

If you're looking for a way to get more out of your personal computer, look no further.



The new A-40 is Canon's first full feature impact matrix printer specially designed for personal computers using IBM compatible software.

Its wide range of functions makes it the economical high-performance printer for anyone who wants to enhance his PC, be it at home or in the office.

The A-40 comes equipped with IBM graphics printer character set 2, and has the same escape codes as the IBM graphics printer. The net result is powerful adaptability and compatibility in one machine—word processing with the right touches in several essential languages and support for IBM PC application programs.

And though the A-40 is compact enough for any home or office, it's capable of handling almost any size job you give it.

In its Draft mode (11 x 9 dot matrix), the A-40 operates at a rapid 140 cps. In the Near-Letter-Quality mode, it produces each character with a sharp 23 x 18 dot matrix at 27 cps...in 3 kinds of graphic image printing. And it does it all very quietly.

The A-40 is designed to function with fanfold, single sheet, and multipart copy paper. And because it has an 8-bit parallel interface that's PC compatible, this new impact matrix printer from Canon can start enhancing your PC from the very first moment you install it.

So when you decide it's time to get more out of your personal computer, look no further than the new Canon A-40 impact matrix printer.

Canon
PRINTERS

© 1985 Canon U.S.A., Inc.

For more information: call 1-800-323-1717, ext. 300. (In IL, call 1-800-942-8881, ext. 300.) Or write Canon U.S.A., Inc., Printer Division, P.O. Box CN 11250, Trenton, NJ 08650

CIRCLE 213 ON READER SERVICE CARD

CONROY-LAPOINTE INC.

#P32

LOW PRICES TO PROFESSIONALS WHO KNOW WHAT THEY WANT AND KNOW HOW TO USE IT

ALL MAIL: Conroy-LaPointe, Inc.
12060 SW Garden Place, Portland, OR 97223

TO ORDER, CALL (800) 547-1289 TELEEX 910 380 3980

HARDWARE & PERIPHERALS FOR YOUR IBM

COMPUTER SYSTEMS



\$995

640K, Two 360K Drives
MS-DOS 2.11, Parallel Port
2 Serial Ports (RS-232C), Clock/Calendar,
Floppy Drive & Tape Backup Controller,
6 Slots, 135 Watt Power Supply, 8087-2
optional, Selectric PC/AT Style Keyboard
w/1 Floppy & 10 meg Hard Drive **\$1595**

Please call for other configurations.
Most prices shown include retail cost of IBM.

FLOPPY & HARD DRIVES

CDC 360K DS-DD
Full Height **\$119**
Half Height **\$ 89**

Full Height **\$119**
Half Height **\$ 89**

Full Height **\$119**
Half Height **\$ 89**

Full Height **\$119**
Half Height **\$ 89**

Full Height **\$119**
Half Height **\$ 89**

Full Height **\$119**
Half Height **\$ 89**

Full Height **\$119**
Half Height **\$ 89**

Full Height **\$119**
Half Height **\$ 89**

Full Height **\$119**
Half Height **\$ 89**

Full Height **\$119**
Half Height **\$ 89**

Full Height **\$119**
Half Height **\$ 89**

Full Height **\$119**
Half Height **\$ 89**

Full Height **\$119**
Half Height **\$ 89**

Full Height **\$119**
Half Height **\$ 89**

Full Height **\$119**
Half Height **\$ 89**

Full Height **\$119**
Half Height **\$ 89**

Full Height **\$119**
Half Height **\$ 89**

Full Height **\$119**
Half Height **\$ 89**

Full Height **\$119**
Half Height **\$ 89**

Full Height **\$119**
Half Height **\$ 89**

Full Height **\$119**
Half Height **\$ 89**

Full Height **\$119**
Half Height **\$ 89**

Full Height **\$119**
Half Height **\$ 89**

Full Height **\$119**
Half Height **\$ 89**

Full Height **\$119**
Half Height **\$ 89**

Full Height **\$119**
Half Height **\$ 89**

Full Height **\$119**
Half Height **\$ 89**

Full Height **\$119**
Half Height **\$ 89**

Full Height **\$119**
Half Height **\$ 89**

Full Height **\$119**
Half Height **\$ 89**

Full Height **\$119**
Half Height **\$ 89**

Full Height **\$119**
Half Height **\$ 89**

Full Height **\$119**
Half Height **\$ 89**

Full Height **\$119**
Half Height **\$ 89**

Full Height **\$119**
Half Height **\$ 89**

Full Height **\$119**
Half Height **\$ 89**

Full Height **\$119**
Half Height **\$ 89**

Full Height **\$119**
Half Height **\$ 89**

Full Height **\$119**
Half Height **\$ 89**

Full Height **\$119**
Half Height **\$ 89**

Full Height **\$119**
Half Height **\$ 89**

Full Height **\$119**
Half Height **\$ 89**

Full Height **\$119**
Half Height **\$ 89**

Full Height **\$119**
Half Height **\$ 89**

Full Height **\$119**
Half Height **\$ 89**

Full Height **\$119**
Half Height **\$ 89**

Full Height **\$119**
Half Height **\$ 89**

Full Height **\$119**
Half Height **\$ 89**

Full Height **\$119**
Half Height **\$ 89**

Full Height **\$119**
Half Height **\$ 89**

Full Height **\$119**
Half Height **\$ 89**

Full Height **\$119**
Half Height **\$ 89**

Full Height **\$119**
Half Height **\$ 89**

OTHER HARDWARE

AST, SuperPak 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000, 1001, 1002, 1003, 1004, 1005, 1006, 1007, 1008, 1009, 1010, 1011, 1012, 1013, 1014, 1015, 1016, 1017, 1018, 1019, 1020, 1021, 1022, 1023, 1024, 1025, 1026, 1027, 1028, 1029, 1030, 1031, 1032, 1033, 1034, 1035, 1036, 1037, 1038, 1039, 1040, 1041, 1042, 1043, 1044, 1045, 1046, 1047, 1048, 1049, 1050, 1051, 1052, 1053, 1054, 1055, 1056, 1057, 1058, 1059, 1060, 1061, 1062, 1063, 1064, 1065, 1066, 1067, 1068, 1069, 1070, 1071, 1072, 1073, 1074, 1075, 1076, 1077, 1078, 1079, 1080, 1081, 1082, 1083, 1084, 1085, 1086, 1087, 1088, 1089, 1090, 1091, 1092, 1093, 1094, 1095, 1096, 1097, 1098, 1099, 1100, 1101, 1102, 1103, 1104, 1105, 1106, 1107, 1108, 1109, 1110, 1111, 1112, 1113, 1114, 1115, 1116, 1117, 1118, 1119, 1120, 1121, 1122, 1123, 1124, 1125, 1126, 1127, 1128, 1129, 1130, 1131, 1132, 1133, 1134, 1135, 1136, 1137, 1138, 1139, 1140, 1141, 1142, 1143, 1144, 1145, 1146, 1147, 1148, 1149, 1150, 1151, 1152, 1153, 1154, 1155, 1156, 1157, 1158, 1159, 1160, 1161, 1162, 1163, 1164, 1165, 1166, 1167, 1168, 1169, 1170, 1171, 1172, 1173, 1174, 1175, 1176, 1177, 1178, 1179, 1180, 1181, 1182, 1183, 1184, 1185, 1186, 1187, 1188, 1189, 1190, 1191, 1192, 1193, 1194, 1195, 1196, 1197, 1198, 1199, 1200, 1201, 1202, 1203, 1204, 1205, 1206, 1207, 1208, 1209, 1210, 1211, 1212, 1213, 1214, 1215, 1216, 1217, 1218, 1219, 1220, 1221, 1222, 1223, 1224, 1225, 1226, 1227, 1228, 1229, 1230, 1231, 1232, 1233, 1234, 1235, 1236, 1237, 1238, 1239, 1240, 1241, 1242, 1243, 1244, 1245, 1246, 1247, 1248, 1249, 1250, 1251, 1252, 1253, 1254, 1255, 1256, 1257, 1258, 1259, 1260, 1261, 1262, 1263, 1264, 1265, 1266, 1267, 1268, 1269, 1270, 1271, 1272, 1273, 1274, 1275, 1276, 1277, 1278, 1279, 1280, 1281, 1282, 1283, 1284, 1285, 1286, 1287, 1288, 1289, 1290, 1291, 1292, 1293, 1294, 1295, 1296, 1297, 1298, 1299, 1300, 1301, 1302, 1303, 1304, 1305, 1306, 1307, 1308, 1309, 1310, 1311, 1312, 1313, 1314, 1315, 1316, 1317, 1318, 1319, 1320, 1321, 1322, 1323, 1324, 1325, 1326, 1327, 1328, 1329, 1330, 1331, 1332, 1333, 1334, 1335, 1336, 1337, 1338, 1339, 1340, 1341, 1342, 1343, 1344, 1345, 1346, 1347, 1348, 1349, 1350, 1351, 1352, 1353, 1354, 1355, 1356, 1357, 1358, 1359, 1360, 1361, 1362, 1363, 1364, 1365, 1366, 1367, 1368, 1369, 1370, 1371, 1372, 1373, 1374, 1375, 1376, 1377, 1378, 1379, 1380, 1381, 1382, 1383, 1384, 1385, 1386, 1387, 1388, 1389, 1390, 1391, 1392, 1393, 1394, 1395, 1396, 1397, 1398, 1399, 1400, 1401, 1402, 1403, 1404, 1405, 1406, 1407, 1408, 1409, 1410, 1411, 1412, 1413, 1414, 1415, 1416, 1417, 1418, 1419, 1420, 1421, 1422, 1423, 1424, 1425, 1426, 1427, 1428, 1429, 1430, 1431, 1432, 1433, 1434, 1435, 1436, 1437, 1438, 1439, 1440, 1441, 1442, 1443, 1444, 1445, 1446, 1447, 1448, 1449, 1450, 1451, 1452, 1453, 1454, 1455, 1456, 1457, 1458, 1459, 1460, 1461, 1462, 1463, 1464, 1465, 1466, 1467, 1468, 1469, 1470, 1471, 1472, 1473, 1474, 1475, 1476, 1477, 1478, 1479, 1480, 1481, 1482, 1483, 1484, 1485, 1486, 1487, 1488, 1489, 1490, 1491, 1492, 1493, 1494, 1495, 1496, 1497, 1498, 1499, 1500, 1501, 1502, 1503, 1504, 1505, 1506, 1507, 1508, 1509, 1510, 1511, 1512, 1513, 1514, 1515, 1516, 1517, 1518, 1519, 1520, 1521, 1522, 1523, 1524, 1525, 1526, 1527, 1528, 1529, 1530, 1531, 1532, 1533, 1534, 1535, 1536, 1537, 1538, 1539, 1540, 1541, 1542, 1543, 1544, 1545, 1546, 1547, 1548, 1549, 1550, 1551, 1552, 1553, 1554, 1555, 1556, 1557, 1558, 1559, 1560, 1561, 1562, 1563, 1564, 1565, 1566, 1567, 1568, 1569, 1570, 1571, 1572, 1573, 1574, 1575, 1576, 1577, 1578, 1579, 1580, 1581, 1582, 1583, 1584, 1585, 1586, 1587, 1588, 1589, 1590, 1591, 1592, 1593, 1594, 1595, 1596, 1597, 1598, 1599, 1600, 1601, 1602, 1603, 1604, 1605, 1606, 1607, 1608, 1609, 1610, 1611, 1612, 1613, 1614, 1615, 1616, 1617, 1618, 1619, 1620, 1621, 1622, 1623, 1624, 1625, 1626, 1627, 1628, 1629, 1630, 1631, 1632, 1633, 1634, 1635, 1636, 1637, 1638, 1639, 1640, 1641, 1642, 1643, 1644, 1645, 1646, 1647, 1648, 1649, 1650, 1651, 1652, 1653, 1654, 1655, 1656, 1657, 1658, 1659, 1660, 1661, 1662, 1663, 1664, 1665, 1666, 1667, 1668, 1669, 1670, 1671, 1672, 1673, 1674, 1675, 1676, 1677, 1678, 1679, 1680, 1681, 1682, 1683, 1684, 1685, 1686, 1687, 1688, 1689, 1690, 1691, 1692, 1693, 1694, 1695, 1696, 1697, 1698, 1699, 1700, 1701, 1702, 1703, 1704, 1705, 1706, 1707, 1708, 1709, 1710, 1711, 1712, 1713, 1714, 1715, 1716, 1717, 1718, 1719, 1720, 1721, 1722, 1723, 1724, 1725, 1726, 1727, 1728, 1729, 1730, 1731, 1732, 1733, 1734, 1735, 1736, 1737, 1738, 1739, 1740, 1741, 1742, 1743, 1744, 1745, 1746, 1747, 1748, 1749, 1750, 1751, 1752, 1753, 1754, 1755, 1756, 1757, 1758, 1759, 1760, 1761, 1762, 1763, 1764, 1765, 1766, 1767, 1768, 1769, 1770, 1771, 1772, 1773, 1774, 1775, 1776, 1777, 1778, 1779, 1780, 1781, 1782, 1783, 1784, 1785, 1786, 1787, 1788, 1789, 1790, 1791, 1792, 1793, 1794, 1795, 1796, 1797, 1798, 1799, 1800, 1801, 1802, 1803, 1804, 1805, 1806, 1807, 1808, 1809, 1810, 1811, 1812, 1813, 1814, 1815, 1816, 1817, 1818, 1819, 1820, 1821, 1822, 1823, 1824, 1825, 1826, 1827, 1828, 1829, 1830, 1831, 1832, 1833, 1834, 1835, 1836, 1837, 1838, 1839, 1840, 1841, 1842, 1843, 1844, 1845, 1846, 1847, 1848, 1849, 1850, 1851, 1852, 1853, 1854, 1855, 1856, 1857, 1858, 1859, 1860, 1861, 1862, 1863, 1864, 1865, 1866, 1867, 1868, 1869, 1870, 1871, 1872, 1873, 1874, 1875, 1876, 1877, 1878, 1879, 1880, 1881, 1882, 1883, 1884, 1885, 1886, 1887, 1888, 1889, 1890, 1891,

PC UPDATE BY VIRGINIA DUDEK

NEW YORK - Peter Norton is offering Version 3.10 of his best-selling Norton Utilities. Changes include two new programs: Quick-UnErase, which recovers erased files, and an UnErase-Directory that allows retrieval of "removed," or erased, directories. General improvements include expanded handling of large hard disks, support for the Bernoulli Box, and support for EBCDIC data coding, which is used with mainframe data and IBM's Displaywrite software. Cross-directory operation for all Norton programs is available, as well as an option that provides logging of output information for printer or disk files. Other features include a reverse-order sorting option for Directory Sort and the return of File Attributes, a hidden/system attribute control. Send \$25 to Peter Norton in Santa Monica, Calif., for updates.

CompuServe subscribers can now enjoy 2400-baud dial-up access to CompuServe's on-line telecommunications services. Access sites include: Phoenix, Ariz.; Los Angeles; Baltimore; Dallas; Boston; Chicago; New York; Houston; Detroit; Cleveland; Atlanta; Philadelphia; Denver; Washington, D.C.; Pittsburgh; San Francisco; San Diego; Milwaukee; and Minneapolis. Other sites include Santa Clara, Calif.; Monroe, La.; Columbia, S.C.; Memphis, Tenn.; Wilmington, Del.; Salt Lake City; Louisville, Ky.; San Mateo, Calif.; Seattle; and Columbus, Ohio. Rates for 2400-baud access are \$22.50 per hour or \$19 per hour after 6 p.m. Call CompuServe at (800) 848-8199 or at (614) 457-0802 in Ohio for access phone numbers in each city.

Okidata of Mt. Laurel, N.J., is offering a PROM kit directly to printer owners that adds near-letter-quality printing to its Microline 182 dot matrix printers as well as to the ML 182 parallel, serial, and IBM-compatible printers, and all previous ML 182 models. When the PROM is installed, the ML 182 can print in NLQ at 30 characters per

second. The \$24.95 kit contains a PROM chip, chip installation instructions, and a users manual addendum.

Okidata also announced the \$229 Cut Sheet Feeder 900, an accessory for the Microline 192 and 193 dot matrix printers.

ButtonWare Inc., of Bellevue, Wash., released Version 3.0 of its PC-Calc spreadsheet program. New features include use of all available RAM for spreadsheet workspace, twice the calculation speed of Version 2.0, and a standard spreadsheet matrix of 64 columns by 256 rows. Also added are an advanced sort command, a smart cursor option for faster ten-key entry, and the use of the configure command to customize PC-Calc. The retail price is now \$59.95, up from \$48. For updates, call ButtonWare at 800-J-BUTTON.

Short Take: Ashton-Tate of Culver City, Calif., has reduced prices on its RunTime dBASE programs, which are compatible with dBASE II and dBASE III Developer's Release. Both are now \$50 per unit, with minimum orders of five units. ... MDBS of Lafayette, Ind., announced that its relational database product, MDBS III, Version 3.09, runs in a concurrent DOS multiuser environment. ... Softkey Software of Toronto, Canada, and Monte Sereeno, Calif., has added a new driver to its KeyChart presentation graphics program. It can now work with Hewlett-Packard 7550 A and Nicolet Zeta 8 plotters to accurate batch processing of graphic presentations. A list of predefined charts, multiple copies of a chart, or any combination of files can be plotted while the plotter is left unattended. The software runs for \$375, and the add-on plotter module costs \$275. Call Softkey at (416) 598-5033 for details.

PC Update reports on software and hardware enhancements. To contribute, write or call Virginia Dudek, PC Magazine, One Park Ave., New York, NY, 10016, (212) 503-5265.

Epson Unveils PC Line

BY CHARLES BERMANT

TORRANCE, Calif.—Epson America Inc. hopes that lightning will strike twice. America's biggest seller of dot matrix printers seeks to repeat that success with a trio of personal computers compatible with IBM's three desktop PCs.

Epson's Equity I, II, and III, introduced at COMDEX, parallel the IBM PC, XT, and AT. All three emulate the keyboard layout of the AT and include parallel and serial ports.

The Equity I has a standard 256K bytes of RAM, an 8088 processor, and three expansion slots; it retails for \$995 without

the monitor. A full system is available for \$1,295. One or two drives can be fitted.

An XT Look-alike

The XT-compatible Equity II has an NEC V30 processor switchable to 4.77- or 7.16-MHz clock speeds, five expansion slots, a clock/calendar, and a monochrome/graphics display adapter. It can be configured with one 360K-byte floppy disk or a floppy and a 20-megabyte hard disk. Its price will be under \$1,900.

The Equity III, closer in size to the AT, uses the AT's 80286 processor and has eight expansion slots. Four disk drives can

be installed. It comes with a 640K-byte RAM as standard.

The Equity I began shipping in November, while the II and the III are scheduled for the first quarter of 1986. Epson estimates the Equity III will be priced at \$3,500 to \$5,000, depending on configuration.

Users can build an all-Epson system within certain parameters.

Epson is offering one color and one monochrome monitor for use with any of the machines. However, the company is not offering a combination of dual floppies and a fixed disk, a setup it believes few people want.

Epson will continue to manufacture the QX-16 line with the non-IBM-compatible VAL-DOCS operating system. ■



Epson's 16-bit PC-compatibles, the Equity I, II, and III (shown left to right above), have standard configurations of 256K, 360K, and 640K bytes of RAM, respectively.

Borland introduces Turbo Lightning™ the fastest, most amazing information system since your brain

You can now find out everything in a flash. With instant access to electronic versions of the 83,000 word Turbo Lightning™ Random House Speller & Word List, the 50,000 word Turbo Lightning Random House Thesaurus™ and the soon-to-be-released Turbo Lightning Encyclopedia™ — and to an astonishing array of electronic reference books which form Borland's new Turbo Lightning Library™.

Hitting one key on your IBM® personal computer — taps you into this new electronic age of instant information. You get the right word, the right spelling, the right name, the right address, right now.

What we've done has been called "Artificial Intelligence." We simply call it "Turbo Lightning." This information revolution — driven by Turbo Lightning — means that the way you look things up is definitely looking up.

No matter what program you're running, Turbo Lightning instantly checks your spelling as you type. You could be running WordStar®, MultiMate®, SideKick®, Microsoft® Word, MCI Mail®, CompuServe®, or whatever, because as you work, as you write, Turbo Lightning is waiting in the wings, watching how you spell every word, but not getting in the way of what you're doing.

So how does it work? Let's say the word you meant to type was "RIGHT," but you accidentally typed "RIKHT," which is wrong. What happens then?

You immediately hear a "beep" so you know there was a boo-boo. You instantly see a window that doesn't list "RIKHT," but it does list "RIGHT" and its sound-alike words. So your screen looks like this:

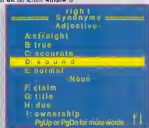


So you move your cursor to "A," which is the right "right." But return and the spelling mistake is instantly fixed. And the program you were working on has continued to run while you did a little spelling with Turbo Lightning. If you'd used our member's true spelling grade at school, the beep might make you sad, but you can't blame the "beep" system. What's more, that when you finish writing the entire page, any spelling mistakes will be highlighted. Now go on and strengthen things out tonight away!

Lightning never goes away, is 100% consistent, reliable, accurate and cannot, does not, will not "crash & burn."

Your document, letter, report, spreadsheet is word perfect and no one ever knows that you can't spell for beans.

Turbo Lightning does a lot more than spell "right," right. It also gives you instant synonyms. Because you also have Turbo Lightning's Random House Thesaurus at your fingertips, you can really get to know your "rights." So back to the word "Right," but this time in the thesaurus. Type in "Right" and what you see in the on-screen window is:



So you instantly know more than one way to say "The Boss is always right," which is handy if you get cornered and have to lie like that.

Introduce yourself to Turbo Lightning and it will never ever forget your name. It's conceivable, if unfair, that your name is not in the dictionary already, but you can instantly teach Turbo Lightning your name and all the other names and words it needs to know to help run your business or personal life.

Once you've taught Turbo Lightning what its name needs to know, you'll never blow it with a letter to the Joint Chiefs of Staff, the Reagan White House or mess something up on your IBM PC. IBM PC is not a trademark of International Business Machines Corp.

Not \$500, not \$400, not \$300, not \$200, not \$100. Just \$99.95 for this instant electronic miracle. Our success is pretty simple. We're not greedy. We believe that it is better to sell hundreds of thousands of software programs at a reasonable price—instead of a few at prices that would make Jesse James blush.

Just \$99.95 gets you into the Turbo Lightning Library—which is an incredible deal when you look at what you're getting. You're getting the "access system" — Turbo Lightning—which is the "engine" that powers the whole Turbo Lightning Library. You're getting the "engine" plus the 83,000-word Turbo Lightning Random House Speller and Word List, the 50,000-word Turbo Lightning Random House Thesaurus. And you're getting all that for an incredible \$99.95!

If you ever write a word, think a word or say a word, you need Turbo Lightning. We give you a 60-day money-back guarantee and of course there's no copy protection. \$99.95 isn't much to pay for a mistake-free life. Not to mention an education. No matter who you are or what you do, you need Turbo Lightning. That \$99.95 will be the best \$99.95 you ever spent on yourself or your company.

Do yourself, your associates, your secretary, your boss, your readers, your audience and your career a favor, get Turbo Lightning today!

TURBO Lightning

To order by Credit Card call (800) 256-8008, CA (800) 742-1133
Available at better dealers nationwide. Call (800) 556-2263 for the dealer nearest you

60-DAY MONEY-BACK GUARANTEE!

System Requirements:
128K IBM PC or 100% compatible computer, with 2 floppy disk drives

Name _____

Shipping Address _____

City _____ State _____ Zip _____

Telephone _____

YES! Rush Turbo Lightning to me
Send me _____ copies

\$99.95

This price includes shipping in all U.S. states. All foreign orders add \$10 per product ordered

Subtotal _____
CA res. add \$6 tax per copy _____
Amount Enclosed _____
Payment VISA MC BankDraft Check _____
Credit Card Exp. Date _____
Card # _____ Exp. Date _____

CCDs and Purchase Orders will NOT be accepted by Borland. Customer's liability, add'l or sales tax (include V.A. reg. and other payment by 3rd party, please) _____

Copyright 1985 Borland International BI-1021



BORLAND
INTERNATIONAL

4545 SCOTTS VALLEY DRIVE, SCOTTS VALLEY,
CA 95066 PHONE (408) 432-8400 TELEFAX (714) 723-7373

CIRCLE 142 ON READER SERVICE CARD

Turbo Lightning, Turbo Lightning Random House Speller, and Turbo Lightning Random House Thesaurus are trademarks of Borland International, Inc. Turbo Lightning Library is a registered trademark of Borland International, Inc. IBM, IBM PC, XT and AT are registered trademarks of International Business Machines Corp. MultiMate is a trademark of MultiMate International Corp. MCI Mail is a registered trademark of MCI Telecommunications Corp. CompuServe is a registered trademark of CompuServe Corp.

How to Save Money...

IBM PC SYSTEMS



MAINSTREET ENHANCED

PC \$1965
with 10 MB Disk

Same System with
20 MB Hard Disk

\$2085

- 360kb Tandon Floppy
- 10 MEG ADEPT Hard Disk
- 256K RAM
- All Controllers, Cables, Manual
- 1 Year Warranty

Monitor Not Included Many Options Available

IBM PC/AT

AT PLUS
\$3860

20MB System

Includes:

- 12 MB Floppy
- 360 KB Floppy
- 512K RAM
- 20 MB Hard Disk
- Serial/Clock
- All Cables, Controllers, Manual



Same System
with 32 mb
\$4071

Monitor Not Included

MORE IBM PC SYSTEMS FROM MAINSTREET

← SUPER PC

- 256K RAM
- 360K Floppy
- 10 MEG

- Tape Drive
- 125 Watt
- 640K RAM

← Slot Saver

- 2 384K Floppies

- 20 MB Hard Disk
- Permyet Video Combo
- 3 Slots Available

← SUPER PC+

- 640K RAM
- 2 Floppy
- 20 MEG Hard
- Tape Backup

- AST 6 PAK
- 125 Watt
- Power

← PC 2/20

- 256K RAM
- 2 360K Floppies
- 20MB Hard Disk

CHIPS

64K - \$8
DRAMS
256K - \$35
DRAMS
8087-3-\$129
80287-\$250

Printers

EPSON FX-50+	\$299
EPSON LQ-1500	\$929
EPSON FX-155	\$499
EPSON LX-80	\$220
TOSHIBA 1340	\$569
TOSHIBA 351	\$1099
TOSHIBA 1351	\$999
TOSHIBA 341	\$999
NEC E-LF	\$449
CITIZEN MSP-10	\$299
OKIDATA 182	\$239
OKIDATA 192	\$349
OKIDATA 193	\$549
OKIDATA 84	\$759

BACK-UP POWER ADEPT

DataShield AT 800	\$609
Back up power 100 Watts	
DataShield XT 700	\$369
DataShield PC 700	\$385
DataShield AT 300	\$559

SURGE Protection

DataShield 5100	\$59
DataShield 505	\$49
DataShield 575	\$34
Keenington	\$95
Masterpiece	\$95

Computer Accessories



COMPAQ OPENPRO™

20 MB
System
\$2999

- FAST 8086 Processor
- 640K RAM
- 20 MB Hard Disk
- 2 - 360kb Floppy
- High Resolution Monitor
- Basic
- 1 Year Warranty

Tape Back Up
10 MB \$590
20MB
\$729

TO PLACE YOUR ORDER CALL
1-800-426-MAIN



HOURS: 9am to 6 pm CST M-F Sat 9-3

**RODIME
10 MB
For
Compaq
\$475**

**COMPAQ Portable
\$2466**

256K, 360KB Floppy, 10MB Hard Disk

ORDERING INFO: All Mail: 1025 Main St., Bastrop TX 78602.
We accept personal and corporate checks. No delay if driver's
license and expiration included. Shipping is free on prepaid orders
via UPS Ground. Air is extra. We accept VISA, MC, (Am. Exp.
and Discover's Club + 3% surcharge.) We double manufacturer's
warranty on all hardware. Software is not returnable. All goods are
new.

Buy Mainstreet and Adept

ADEPT PC



\$749

ADEPT Personal Computer

- 640K RAM
- 360Kb Floppy
- "Touch Type" Keyboard
- 1 Year Warranty
- Runs IBM™ Software

30 Day Trial / 100% Credit Towards IBM PC



ADEPT AT

\$1975

- 80286 Microprocessor
- 1 Megabyte Motherboard
- 1.2 MEG Floppy Drive
- Hard Disk Controller
- "Touch Type AT" Keyboard
- Runs IBM PC, XT, AT Software
- 8 Full-Size Expansion Slots
- 1 Year Warranty

Ask About Our 30 Day Trial Offer



Quick-Six Multifunction Board

- Serial Port
- Parallel
- 384K RAM
- Clock/Calendar
- RAM Disk Software
- Print Spooler

For A Limited Time

\$139

Includes SIDEKICK!
\$54.95 Value Free



AT E•X•P BOARD

- 3MB RAM
- Serial Port
- Parallel Port
- For IBM or ADEPT AT

\$289

MONO/GRAPHICS BALANCE I

\$229

- 720 x 348 Resolution
- Parallel
- Serial
- Runs 1-2-3

**Balance II
\$299**

Mono/Color Graphics

HIGH SPEED TAPE BACK-UP

\$739
20MB

Backs up 20 MB in
less than 10 minutes

60 MB

\$899

Similar to TECMAR
QIC-60

HARD DISKS by ADEPT

**20MB
\$490**

- Half Height
- Complete System
- Mounts Internally
- 1 Year Warranty

10 MB - \$390

32MB - \$695

For really FAST access, call our
hard drive specialist — 800-426-6246



CIRCLE 27 ON READER SERVICE CARD

24 Hour
Bulletin
Board
Service
LIFELINE
800-426-6246
DOWNGRAD
ORDERING
512-321-5387
AD Note:
512-321-4406



10,20,32 MB... From \$595
10 MB

Combination Systems

HARD DRIVE	TAPE	PRICE
10 MEG	10 MEG	\$1185
20 MEG	20 MEG	\$1390
20 MEG	60 MEG	\$1665
32 MEG	60 MEG	\$1870

**800 426-6246
ORDERS
512 321-4406**

Mainstreet Computer
1925 Main St.
Ruston, TX 75462

Hours:
Tech. Assistance Mon-Fri: 9 am-6 pm
Texas Residents, Inquiries Saturdays: 9 am-3 pm

A perfect match! Colors and casing to conform with your IBM or ADEPT PC. In two convenient models to suit your space requirements. Acid hard drives in 10, 20, 32 or 40 megabytes. Cartridge tape backup in 10, 20 or 60 megabytes. Combine hard drive and tape backup for complete storage solutions. All units come with power supply, cables, software and manual.



10,20,32 MB... From \$635
10 MB

Combination Systems

HARD DRIVE	TAPE	PRICE
10 MEG	10 MEG	\$1225
20 MEG	20 MEG	\$1430
20 MEG	60 MEG	\$1705
32 MEG	60 MEG	\$1915

SOFTWARE—Many titles available 800 426-6246

Call for Latest Version and Price
Examples: Borland Superkey \$35 Copy II PC \$25
Multimate \$28 Norton Utilities \$49

THE SMARTEST BUY YOU'LL EVER MAKE: 20 MBYTES OF *AUTOMATIC* TAPE BACK-UP FOR JUST \$795.



ONLY FROM SYSGEN.™

The Sysgen Smart Image.™
More capacity. More features. More value.
The best-selling tape back-up system for the IBM® and compatibles gets even better!

Now the Sysgen Smart Image delivers *double* the storage capacity: 20 Mbytes on a high density cassette. It backs your data up *automatically*. And it comes in two convenient versions: The internal model, for just \$795—or the slim, half-height external chassis for \$895.

Only Sysgen gives you *unattended* back-up. Set the Smart Image once, like a VCR, and it will back up your data up to twice daily, seven days a week. And, if you're using your system, the Smart

Image will wait until you're through, then back up your files automatically. *That's smart.*

You can't pass up a buy like this.

You won't find a smarter solution—or a better price. Sysgen's entire disk and smart tape family offers an unbeatable combination of capacity and value. Our systems are IBM® standard compatible, and run all software written for current versions of PC DOS®. Compare for yourself. For a Sysgen dealer near you, call 1-800-

**821-2151,
Dept. 4 .**



SYSGEN
INCORPORATED

Trademarks: Sysgen, Smart Image, Sysgen Inc. Registered trademarks: IBM, PC DOS, International Business Machines Corporation.
47853 Warm Springs Blvd., Fremont, CA 94539
(415) 490-6770, Telex 4990843

Localnet '85 Highlights Token-Ring Compatibles

BY JOE DESPOSITO

NEW YORK—In the wake of IBM's October introduction of a token-ring network for PCs, the rest of the industry has been scrambling to unveil networks that are compatible with Big Blue's 4-megabit-per-second offering while also trying to go IBM one better on price, features, and performance.

Localnet '85, the first network showcase since IBM's announcement, attracted 40 exhibitors to New York in late October. Among them were companies that have recently announced products that are either compatible with IBM's IEEE 802.3 token-ring LAN or serve as a link to the new network.

Network Management

Proteon Inc. of Natick, Mass., announced the ProNET-4 (4 megabits per second), an IBM-compatible system with a few extras. ProNET-4's network management features include error monitoring, parameter service, and configuration control. It is not limited to linking IBM PCs; computers from other vendors can also be linked to the network through Proteon's host interfaces, which include UNIBUS, Multibus, Q-bus, VMEbus, and PC-Bus.

ProNET-4 consists of a 68000-based microprocessor, two or more network interfaces, and gateway protocol software modules. Together, these can be used to create a mixed-vendor, multispeed networking system. Users can mix wiring media such as shielded twisted-pair, coax, fiber-optic cable, and infrared transmission media within the same network using Proteon's wire centers. ProNET-4 supports several network software programs and protocols, including Novell's NetWare P and NETBIOS.

ProNET-4 will be available in the first quarter of 1986. Price information was not available at press time.

In addition, ProNET-4 users

can connect to the faster ProNET-10 and ProNET LANs via Proteon's ProNET-Linkway gateways. Prices start at \$9,545.

A Token-Ring LAN

Ungermann-Bass Inc. of Santa Clara, Calif., will also offer a series of token-ring products called NetOne. To introduce potential token-ring users to the system, Ungermann-Bass is offering an Intro/Net token-ring starter kit that includes enough components for users to set up a complete two-ring network connected by a bridge. The token-ring LAN has a data transfer speed of 4 megabits per second and includes server support for hosts, terminals, printers, and modems as well as



Ungermann-Bass's S275 Network Transceiver clamps on to a network cable, allowing low-cost, simple addition of workstations to a network.

workstation support for Intel Corp.'s Multibus and IBM's PC bus products.

Also included is a ring-to-ring bridge that allows users to set up a second ring if their total number of token-ring units exceeds 260, the maximum supported by IBM.

The NetOne software package consists of NetOne operating software, virtual circuit service, personal-connection software, and network-management software. The NetOne starter kit is slated for release in January 1986.

Ungermann-Bass also announced two other products. The NetOne Buffered Repeater extends the end-to-end length of Ethernet-compatible LAN systems that run the following communications protocols: DECnet, TCP/IP, ISO, and XNS. The \$3,000 buffered re-

peater extends the distance between two ends of an Ethernet LAN from 2,800 meters to 27 miles.

A second product, the NetOne Transceiver, is an updated version of Ungermann-Bass's earlier transceiver. It allows you to connect a network station to the NetOne network cable without having to cut into the cable. The S275 transceiver clamps on to the cable for simpler addition of workstations.

More Products

Bridge Communications of Mountain View, Calif., announced that it is developing a line of IBM-compatible token-ring products for release in the first quarter of 1986. These first products will include terminals, personal computers, and host communications servers.

In addition, Bridge will introduce an Ethernet-to-token-ring gateway that links Ethernet and the IBM token-ring networks together. Prices for the Bridge line are currently not available and will be announced officially when the products are introduced.

AST Research Inc. of Irvine, Calif., announced four new products: the AST Resource Sharing Network (a single-slot adapter card), which is compatible with IBM NETBIOS; *AST-NETBIOS Option*, an IBM-compatible network interface program used to manage the network; *AST-Network Program*, the user interface; and a gateway to connect AST, IBM, or compatible LANs to an IBM mainframe called the *AST-SNA/BSC Gateway* which will be released in January 1986. Also included is a network version of the *Knight Data Security Manager* software package. The AST network package is scheduled to be released in December 1985.

An Intelligent Adapter

Although not on the exhibit floor, two major players made product announcements before Localnet '85. 3Com Corp. of Mountain View, Calif., announced three products relating to IBM's token-ring network. 3Com is planning an intelligent adapter compatible with IBM's



The AST Resource Sharing Network comes with the AST-NETBIOS Option network interface, Knight Data Security Manager, and the AST-Network Program user interface.

token-passing-ring network board that also handles its own communications processing; the company will also introduce software based on IBM's NETBIOS and DOS 3.1. Finally, 3Com will supply a token-ring interface for its 3Server network server. This interface lets the 3Server function as either a dedicated server for the token ring or a gateway between the token ring and an 802.3 Ethernet LAN.

Also, Novell Data Systems of Orem, Utah, announced a new network operating system linking IBM's token-ring network to the company's existing network operating environments—Advanced Network and System Fault Tolerant Network.

In other LAN developments, Nestar Systems of Palo Alto, Calif., intends to make its PLAN products, which include the recently introduced PLAN 3000B local area network, compatible with IBM's token-ring LAN. Current Nestar networks can be upgraded for compatibility. The 3000B is a complete LAN system designed to support up to ten PC-based workstations. It is available immediately for \$16,995. The price includes a 68-megabyte file server, a server console (CRT), a 45-megabyte tape backup, Shadow file server software, PLANpak starter software library, an integrated print server coprocessor, ten network interface cards, and a 16-port HUB.



Ungermann-Bass's NetOne Buffered Repeater, priced at \$3,000, extends the end-to-end length of Ethernet LANs from 2,800 meters to 27 miles.

HOW TO BUY ASHTON-TATE SOFTWARE WHEN ALL THE ADS LOOK THE SAME

Chances are, you already know the reasons why Ashton-Tate™ is your best choice for integrated spreadsheet and database management software:



FRAMEWORK II™ builds upon what Software Digest ranked as the best integrated package. **FRAMEWORK II™** not only contains one of the fastest spreadsheets available, but it has a host of additional functions such as built-in mailmerge and label printing; and import and export of major application software including Multimate and IBM DisplayWrite.



dBASE III® is the World's best selling relational database, and with good reason. Whether you are an expert programmer, or a novice, **dBASE III®** can handle all your database needs. **dBASE III's®** on line help function gives you the user friendliness of a file manager, without sacrificing any power.

But just knowing the reasons why you should buy Ashton-Tate™ software isn't enough. You still need to find an Ashton-Tate™ supplier who can guarantee that you get the most from their software. All the ads trumpet the same headlines: "Lowest Prices," "Fastest Delivery," "Best Support," "Biggest Inventory." Trouble is, although the claims are the same, the companies are very different. Which is why we want you to know some important facts about us:

1. *800 Software is an authorized Ashton-Tate™ reseller*, which protects our Ashton-Tate™ customers from not having their technical questions answered, their software supported, and their updates processed. Anyone can sell you a box off the shelf, but not anyone can satisfy Ashton-Tate's™ support requirements.
2. *800 Software is one of the oldest and most reputable firms in the industry*. Our customers include Coca-Cola, GE, Hewlett Packard, Xerox, AT&T, and thousands of other satisfied buyers.
3. *Our technical support department is one of the best in the country*, assuring that you will get the most from the software and peripherals you purchase from 800 Software. Every purchaser also gets a copy of our Technical Support Manual.
4. *We have a giant \$1,000,000 inventory comprised of hundreds of different programs*. Which means we fill your order immediately, and we can offer next day delivery if needed.

Call today for a free copy of our "Buyer's Guide to Discount Software," which explains how 800-Software can go to work for you.

Software from
ASHTON-TATE™

800-SOFTWARE

940 Dwight Way • Berkeley, CA 94710 • (415) 644-3611

Ashton-Tate and dBase III are registered trademarks of Ashton-Tate. Framework is a trademark of Ashton-Tate.

**800-872-2667 (USA)
800-225-9273 (CA)**

CIRCLE 236 ON READER SERVICE CARD

DOWNTIME BY WINN L. ROSCH

Two AT Look-alikes Offer More Speed, Lower Prices

If you're a power user, you know how addictive speed can be. You weren't satisfied with your PC, so you bought an XT. Then an AT. You may even have put a high-speed crystal in that. Your machine runs so fast that you get answers before you even press the Enter key. If you weren't so broke, you'd be looking for something faster still.

Now IBM has gone and spoiled all the fun. A couple of deft strokes on a programmer's part created a revised AT BIOS (basic input/output system, the

with investigating some real progress in both speed and price being wrought by smaller innovators.

PC's Limited AT

IBM's AT ROM change won't have any effect on the handful of high-speed compatibles and clones blossoming on the marketplace.

The one I'm typing on now is a current price leader, the PC's Limited AT. Unlike the updated AT, this computer puts no artificial barrier between you and your imagination. For in-

AT both in performance and appearance. The only giveaway that the PC's Limited machine is an ersatz AT is the logo on the upper left of the front panel and the lack of a plastic dress panel on the back.

Inside, you'll find a Faraday ATcase system board, the same slot complement as the IBM machine, and a 192-watt power supply. Standard equipment includes 1 megabyte of memory (all on the system board), a clock, two serial ports, a parallel port, a combined hard disk/floppy drive controller, and a high-capacity floppy drive. Neither a monitor nor a monitor adapter is included. The keyboard, by Hi-Tech, weighs less than the official IBM keyboard, and its spacebar is stiff but serviceable.

I used the machine for about 2 weeks without a hitch, glitch, or incompatibility. My conclusion: At 6 MHz, it rates as a bargain; at 9 MHz, it's a treasure.

PC Designs ET-286i

One of the first inexpensive AT compatibles actually designed to operate at such higher speeds will soon be available from PC Designs—the ET-286i. Its \$2,400 price buys a desktop code burner, which runs at either 6, 8, or 10 MHz (switch-selectable), that includes three serial ports, two parallel ports, a clock, hard disk/floppy drive controller, a 1.2-megabyte floppy, a monochrome graphics adapter, and a Princeton Graphics MAX-12 monitor.

The system board of the ET-286i is manufactured by ACS International, and according to Patrick H. Griffin, president of

PC Designs, it holds the promise of even higher performance. When the supply of high-speed 80286 chips starts flowing out of Intel sometime around March 1986, the ACS board will enable ET-286i to be upgraded to 12 MHz—double the throughput of a plain AT.

As with the PC Designs FD-1000, an XT clone, the new ET-286i AT look-alike is sold unassembled. Fifteen minutes with a screwdriver will earn you a high-performance bargain indeed. In addition, you might just find yourself with a new reputation around the office—not just as a fast worker or power user but as a purchasing and engineering genius. ■

PC's Limited AT PC's Limited

7801 N. Lamar
Austin, TX 78752
(800) 426-5150
(512) 452-0323

List Price: \$1,995 (1 Mbyte RAM, two serial ports, parallel port, clock, floppy/hard disk controller, 1.2-Mbyte disk drive, keyboard, No monitor or adapter).

PC Designs ET-286i

PC Designs Inc.
11105-B E. 56th St.
Tulsa, OK 74146
(918) 252-5550
(212) 554-6306

List Price: \$2,400 (1,024K RAM, three serial ports, two parallel ports, clock, floppy/hard disk controller, 1.2-Mbyte disk drive, monochrome adapter, Princeton MAX-12 monitor, keyboard).

The \$1,995 PC's Limited AT is virtually identical to a real IBM AT both in performance and appearance.

program code inside the AT's ROM) that has frozen all new ATs at a Neanderthal 6-MHz speed.

The official reason is probably that the ROM BIOS change ensures the AT will always operate at a speed at which it is reliable. The real reason may run somewhat deeper: Ever-quicker ATs were getting too competitive with IBM's line of minicomputers and possibly some of the slower mainframes. Dumping a governor into the code prevents such internal competition and gives IBM the chance to sell a newer, faster model AT in the future.

Let's not speculate on future IBM products or its marketing intentions. (IBM won't, so why should we?) Instead, let the gods of Armonk go their own way while we occupy ourselves

stanced, a crystal transplant goosed my machine's system clock—and performance—up 50 percent, to 9 MHz. According to Michael Dell, the 20-year-old president of PC's Limited, he's gotten a few of his machines up to 10 MHz. (When I was 20, I was still trying to figure out what girls were.) [He still is.—Ed.]

Be aware, however, that the speed capabilities of any computer model vary even within production runs. As with the IBM AT, you get no guarantee a PC's Limited AT will operate reliably at speeds higher than its factory-issued 6 MHz.

However, what you do get is enough to make you think hard about crossing the IBM AT—or even XT—and your purchase order and inking in PC's Limited AT. The \$1,995 computer is virtually identical to a real IBM



See us at Booth #8818
MGM Grand Hotel

COMDEX Fall '85



The Most Powerful LAN Fits on a Disk.

Network Power. You knew that someday there would be a powerful LAN that didn't need old-technology network boards. It would be fast, easy to install, and run 99% of PC-DOS software. It would be expandable, provide remote access, password-protection, and enable you to use inexpensive terminals as workstations in a PC-DOS environment.

Dream no more, because the power is here. Its name is LANLink™.

A Software-Driven LAN Powerful Enough to Use RS-232 Ports for Network Communications. In development for over three years, LANLink™ represents the next generation of local area networks. All of the logic which has traditionally resided on network boards is on LANLink's Satellite and Server Diskettes.

No additional hardware is required. Inexpensive serial ports replace "Kilobuck™" Network Interface Boards making installation costs one-third that of a board-driven network.

How to Configure a Smart Network...With Dumb Terminals, But Without Dedicated Servers. Boasting a wide variety of configurations, LANLink™ is most often set up as a "Star" having up to eight satellites connected to a central, nondedicated server. Larger networks can have multiple servers, supporting a total of 73 or more network users.

R-LAN™ (Remote-LAN) gives users the ability to interact with a LANLink™ network in real time via modem. Plus, it MultiLink Advanced™ is run on a Satellite, inexpensive dumb terminals can be used to access network disks, files, and programs.

99% of PC-DOS Applications Run in a Totally-Transparent Network Environment. If you know DOS, you already know how to use LANLink™ COPY transfers files among users, and a 2-drive PC Satellite boots 1-2-3 from the Server's hard disk with the entry c:\otus. Each satellite's access can be limited to specific disks, printers, and sub-directories. A wide variety of software including Lotus 1-2-3, dBASE III, and WordStar 2000 is fully compatible. LANLink™ has a collision-free data transfer rate which exceeds 115,000 BPS.

Power Up Your PCs Today. For complete details and the authorized dealer nearest you, call The Software Link TODAY. The LANLink™ Starter Kit is \$495 and includes modules for both a Server and a Satellite. For a limited time, 50 feet of shielded RS-232 cable will be included free of charge. Additional Satellite Modules are only \$195, each.

LANLink™ is immediately available and comes with a money-back guarantee. VISA, MC, AMEX accepted.

LANLink™

 **THE SOFTWARE LINK, INC.**
Developers of LANLink™ and MultiLink Advanced™

6601 Dunwoody Place, Suite 632, Atlanta, GA 30338 Telex 4996147 SWLINK

CALL: 404/998-0700

Dealer Inquiries Invited

THE SOFTWARE LINK, INC./CANADA 406 Fins Park Drive, Suite 18
Toronto (Markham), Ont. L3R 3K2 CALL: 416/477-5450

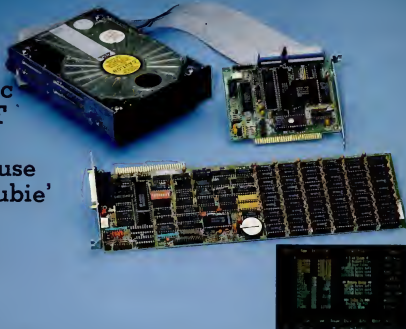
LANLink™ MultiLink Advanced™ & R-LAN™ are trademarks of
The Software Link, Inc.

IBM, PC, & PC-DOS are trademarks of IBM Corp. WordStar 2000,
dBASE III, and Lotus 1-2-3 are trademarks of MicroPro, Ashton-
Tate, and Lotus Development Corp., respectively.

CIRCLE 393 ON READER SERVICE CARD

Full Blown XT

Turn
your basic
PC or XT
into a
Powerhouse
with a Qubie'
XTKit.



Savvy buyers have long been aware that they can save money by buying a single drive PC or XT and add their own multifunction card and hard disk. Now you can get our two most popular add-ons together at our lowest price ever.

THE GIANT KILLER. The BT6Plus has all the features you expect of a multifunction card; 384K of memory, serial and parallel ports, battery powered clock/calendar, and optional game port (\$20). You also get print spooling and RAM disk software. We've sold thousands of this board to large corporations, universities, and government agencies more interested in performance and value than a flashy name. At our regular price of \$197.50, it's a real bargain; in this package, it's a steal.

QUBIE' PC20 HARD DISKS offer the best available combination of performance, ease of installation, and reliability. But don't just take our word for it. Listen to the experts:

"The user manual is the best written and organized of those reviewed...it's bargain-basement price, excellent documentation, drive replacement policy, and changeable interleave, may be the best deal going." PC WORLD 8/85

"Perfect for anyone wanting to get XT performance without paying the price."
PC WEEK 9/84

"Rugged construction, and DOS simplifying software (1dir) make the Qubie' hard disk add-in a standout." PC PRODUCTS 12/84.

"Installation is easy. The documentation walks you through the entire process... We found the Qubie' consistently performed faster than the Microscience drive, shaving as much as one-third off the times in a series of access time tests... Considering the performance and money back guarantee, we have to rate the Qubie' PC20 a special value because of its relatively low price." INFOWORLD 9/16/85.

Full reprints of these reviews available upon request.

NOW INCLUDED: ZyINDEX, the hard disk librarian. The special Qubie' version scans your hard disk looking for words or phrases you specify. Retrieves and displays the file in just seconds. It's a real "super searcher".

XTKit-1 \$699:

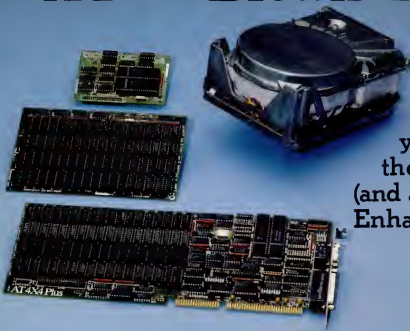
BT6Plus with 384K memory, serial, parallel, clock, BTDRIVE and BTSPool software. 1 year warranty.

Qubie' PC 20 includes: 20 Megabyte hard disk, 5.25" controller, cables, Installation and User's Guide, 1dir and ZyIndex software. 1 year warranty.

XTKit-2 \$1449 (BT44 28 Milliseconds Drive)

BT44 drive, BT6Plus with 384K memory, serial, parallel, clock, BTDRIVE and BTSPool software. 1 year warranty.

AT Blown Full



Our 1-2
punch lets
you create
the ultimate
(and affordable)
Enhanced AT.

Your AT is no toy - it's a serious piece of computing equipment which requires the finest in peripherals to unleash its power. Qubie' ATKits are the solutions to turning an unenhanced IBM AT or compatible into a supercharged system which will run circles around the IBM "Enhanced" models. For thousands less than the difference between a basic and an Enhanced 20 or 30 megabyte AT, we will give you more memory, extra I/O ports, and a bigger, faster, hard disk.

THE DREAMBOARD: AT4X4Plus. This one picks up where other multifunction cards leave off. The most memory: up to 4 megabytes available. More I/O ports: parallel and serial port standard, three more serial ports optional. More flexible: runs on computers at up to 10Mhz clock speed, optional game port available. Top Quality: Made in America to exacting specifications.

MORE PONIES UNDER THE HOOD. A computer that chews up data like an AT, needs a hard disk with the capacity and the speed to supply the data fast. Our BT44 hard drive has a formatted capacity of 44 megabytes, substantially more than IBM's offerings.

IS IT FAST? We tested our BT44 drive with Core International's disk test program (they are the folks selling 40 Mb drives for the AT for \$2595). The results of their "Average Access Time for Random Test" was an amazing 25.97

milliseconds. The synopsis at the end of the tests summed it up best: "This is the ultimate in hard disk performance. It exceeds all IBM specifications by more than thirty percent for the PC-AT."

YOU CAN'T LOSE. With our famous 30 Day "No Risk Guarantee", your satisfaction is assured. We even pay the return freight if you are not completely satisfied. Our crack tech support staff is here to answer any questions you might have during installation or operation. And if anything breaks, our 48 hour turnaround policy will have you back up in no time.

ATK-1 AT4X4Plus w/512K RAM & BT44 drive	\$1295
ATK-2 AT4X4Plus w/1MB RAM & BT44 drive	\$1395
ATK-3 AT4X4Plus w/2MB RAM & BT44 drive	\$1595
AT4X4-RAM (Expands 2MB to 4MB)	\$395
AT4X4-SER (Expands 2 serial ports to 4 serial ports)	\$129

For fastest delivery, send cashier's check, money order, or order by MasterCard/VISA. For personal checks, allow 10 days to clear. Company purchase orders accepted, call for prior authorization. California residents, add 6% sales tax.

Hours: M-F 8am - 5pm PTZ Sat 8am - 12pm PTZ
London (01) 223-4589 Sydney (02) 579-3322
Paris (01) 321-8316 Canada (403) 434-9444

Outside California Inside California
800-821-4479 805-987-9741
CIRCLE 235 ON READER SERVICE CARD

QUBIE'

Department P
4809 Calle Alto
Camarillo, California
93010



**CHECKS YOUR SPELLING
AS YOU TYPE...**
yes, instantly, as you type each word...



*...and beeps when
you make a
mistake...*

Whoops!
THE REAL-TIME SPELLING CHECKER

ONLY \$49.95*
LIMITED
TIME

Checks Spelling 3 Ways

1. Checks words as they are typed in real time; beeps at each error.
2. Checks an entire screen; highlights errors.
3. Reads and checks ASCII text files from disk; lists errors.

Hardware Requirements

Whoops! runs on the IBM PC and compatibles. It uses only 54K RAM when you run it from disk or 182K RAM when you run it direct from memory.

Loaded With Features


- Works with most word-processing and spreadsheet programs including Wordstar, Personal Editor, Volkswriter, PFS Write, and Multimate.
- Pop-up Menu — simple to use.
- 50,000-word dictionary; add your own words too!
- Displays dictionary at any time to locate correct spellings.
- Displays hyphenation.
- Runs invisibly in the background until you need it.

Money-Back Guarantee

Since 1980 Cornucopia Software has pioneered in spelling and grammar checkers. Now another first, a Real-Time spelling checker. **Whoops!** is not copy protected, and has a 30-day money-back guarantee. Our low introductory price makes it a must, even if you already own a spelling checker. To order, call now toll free.

* Add \$3 ground shipping, \$5 air shipping

Cornucopia Software, Inc. • 1-800-343-2432

 **P.O. BOX 6111 □ ALBANY, CA 94706 □ WITHIN CALIFORNIA CALL 415-528-7000**

IBM and Personal Editor trademarks IBM Corp. Microsoft and Word trademarks Microsoft Corp. Multimate trademark Multimate International Corp. Volkswriter trademark Lifetime Software Inc. Wordstar trademark MacroPro International Corp. PFS Write trademark Software Publishing Corp. Whoops! trademark Cornucopia Software Inc.

CIRCLE 140 ON READER SERVICE CARD

Loose Ends

Thoughts on the consequences of copy protection, developing an OS that gives full graphics support, ways to manage priorities under multitasking, and other issues likely to haunt us in 1986.

This year is coming to a close with a surfeit of unfinished business.

There are important issues for both manufacturers and users that need to be resolved. Unfortunately, many of them are not likely to be resolved in 1986 either.

At the absolute top of my list is copy protection. Nobody likes copy protection, not even the companies who use it. But many continue to copy-protect their products.

I blame the whole thing on spreadsheets. The manufacturers have so overanalyzed their profitability based on ROI, that they can't tolerate the thought of losing a single sale. Such sophomoric B-school thinking flies in the face of seasoned observations such as that of the late George Tate, who claimed that *dBASE II* would never have achieved its market domination without the widespread copying that made it the de facto standard. George evidently lost the battle on *dBASE III*, although he may have been influenced by Ashton-Tate's investment in Vault Corp., the vendor of *Prolok*.

Corporate Schizophrenia

Copy protection has also created corporate schizophrenia. Microsoft's systems products are not copy protected, while its consumer products are. Does it really think that end users are less moral than systems integrators? Or do they really intend that everybody should have a copy of *Windows*, no matter how they get it? I, for one, reject the notion that copying causes financial hardship to a company. In fact, I challenge anyone to identify a single company that's gone out of business because users have stolen it blind through copying.

And what about site licensing? What are its legal ramifications? Does a site license protect the manufacturer's copyright? Would John Updike site license his next novel?

Copy protection wastes entirely too much energy. User groups are a vital resource in the continuing computerization of America. Groups such as the Capital PC User Group, one of the nation's largest, have spent countless hours getting its Us-



Bill Machrone

er's Bill of Rights before the press, users, and manufacturers. It has taken a hard line on the usability of software, including the freedom from countless key disk swaps. My sadistic idea of fun would be to invite W. Krag Brothy and the other heads of companies that vend copy protection schemes to a Capital PC meeting (as many as 600 people come out on a good night) and watch them have at one another. Let's put the invective where it belongs.

Graphics Standards

Another issue that concerns me is graphics standards. There aren't any. There are some good ideas out there, but nothing that could be construed as a standard. *Microsoft Windows*'s virtual device interface is close to what we need, and Adobe Systems' PostScript printer language is a breath of fresh air. But ultimately, the operating system is going to have to

stop pretending that graphics devices don't exist. When the system gives a full range of graphics support to the designers, they'll stop reinventing the wheel. Micrografix's new CAD program, *In-a-Vision*, works synergistically with *Microsoft Windows*. It saved the company tons of programming, since it didn't have to think about the windowing interface. We need more stuff like this.

Operating Systems

Now that Microsoft has won the operating systems battle, have users lost the war? Will there be as strong an impetus to keep developing MS-DOS without the sparkplug of competition?

Concurrent PC-DOS was really a pretty good operating system. Though it didn't have a chance against the Microsoft juggernaut, it embodied a lot of grown-up operating system ideas in a small package with reasonable performance. I've said before that the PC is an architectural disaster area for multiuser/multitasking operations, so any OS that can deliver even a semblance of performance on a PC wins my respect.

I felt that way about *Top View*. I shouldn't talk about it in the past tense just yet; we may not have heard the last of it. But it probably shouldn't have been introduced without a solution to the memory barrier. AST's recent bundling of Quarterdeck Systems' *Desqview* shows that at least one of the expanded memory specs is viable for more than just big spreadsheets. However, *Desqview* is attractive for character-only applications, and the future is graphics.

DOS Enhancers

Hey, I'm as big a *SideKick* fan as the next guy, but things have gotten out of hand with RAM-resident DOS enhancement programs. How many things can you

We have over 1000 Software and hardware items in stock. Shipments on almost all items within 24 hours!

WAREHOUSE DATA PRODUCTS

TOLL-FREE ORDER LINE 1-800-421-3135

Call for programs not listed.

Seasons Greetings

Technical & Other Info.
(602) 246-2222

SOFTWARE

DATA BASE MANAGERS

Clipper	\$345
Clout 2	.....
Condor II	.....
Fox and Geller Quickcode	.....
Fox and Geller Quickreport	.....
KnowledgeMan	.....
KnowledgeMan II	.....
K Paint	.....
K Graph	.....
K Text	.....
K Report	.....
Nutshell	.....
PFS: File	.....
Power Base 2.1	.....
RBase 5000	.....
Think Tank	.....
Tim IV	.....

WORD-PROCESSING

Easy (Micro Pro)	.....
Leading Edge w/Merge	.....
Microsoft Word	.....
Multimate 3.31	.....
Multimate Advantage	.....
Office Word Plus	.....
Peashtech 5000	.....
PFS: Writs	.....
Random House Spell Checker	.....
Semra III 3.0	.....
VolksWriter Deluxe	.....
Word Perfect 4.1	.....
Wordstar	.....
Wordstar Pro	.....
Wordstar 2000	.....
Wordstar 2000+	.....

SPREADSHEETS

Microsoft Multiplan	.....
PFS: Plan	.....
Supercalc II	.....
Supercalc III 2.1	.....

ACCOUNTING

BPI Accounts Payable	.....
BPI Account Receivable	.....
BPI General Accounting	.....
BPI Payroll	.....
Cyma	.....
Dollars and Sense	.....
MSI	.....
Tobias Managing Your Money	.....

TCS, Big Four equivalent of Peachtree Series 4 - Specially augmented and customized for your IBM PC Terminal and Printer - GL, AR, PA, AP, CP/M-80, CP/M-86 for PC, DOS 1.1, 2.0. Each Module \$65 For All Four \$249

INTEGRATED

Enable	.....
Smart Software	.....

TRANSFER PROGRAMS

Crosstalk XVI	.....
Hayes Smartcom II	.....
Microsoft Access	.....
Move-It	.....
Revute	.....

GRAPHICS

Chartmaster	.....
STB Halo II	.....
Enargraphics w/Plotter	.....
Enargraphics w/Plotter	.....

SOFTWARE

Fontina	.....
Graphwriter/Combo	.....
Microsoft Flight Simulator	.....
PC Paint Brush	.....
PFS Graph	.....
Signmaster	.....

LANGUAGES

Concurrent PC/Dos	.....
Fortran 77	.....
Lattice C Compiler	.....
Run C Interpreter	.....
Microsoft C Compiler	.....
Microsoft Fortran	.....
Microsoft Macro Assembler	.....
Microsoft Pascal Compiler	.....
Microsoft Quick Basic	.....
Multi Halo	.....

PROJECT MANAGEMENT

Harvard Project Manager	.....
Microsoft Project	.....
Super Project	.....
Total Harvard Project	.....

UTILITIES

Copy II PC	.....
Copy II PC Board	.....
Copyright	.....
Micro Utilities 3.0	.....
PC Tools	.....
Prokey 4.0	.....
Superkey	.....

HARDWARE

BUYS OF THE YEAR

Expansion Board 0 to 576K	.....
KBS151 Keyboard Equivalent	.....
Hercules Graphic Board	.....
w/Par Port Equivalent	.....
AST Six Pack Equivalent	.....
1 Year Warranty	.....

HARD DRIVES

Bernoulli 20 MB 1/2 in.	.....
Seagate 20 MB Internal w/Controller	.....
Eit 360 10 internal	.....

MODEMS

Anchor Express	.....
Hayes 1200	.....
Hayes 1200B w/Software	.....
Hayes 2400	.....
Promodem 1200B w/Software	.....
Promodem 1200	.....

RAM

64K 150NS Chips (Set of 8)	.....
256K Ram Chips (Set of 8)	.....

BOARDS

AST Advantage	.....
AST Superk (244K)	.....
Hercules Color Card	.....
Hercules Graphics Card	.....
J RAM III	.....
Paradise Five Pak	.....
Paradise Modular Graphics Card	.....
Quadram Board with Par/Ser	.....
and Game Port	.....
Quadcolor I	.....
Sigma Maximizer Multifunction	.....
Sperry 512K Expansion w/128K	.....
STB Chauffeur Board	.....
STB Mono Board	.....
AB Parallel Print Switch w/cables	.....
Mini Micro Par Print Buffer	.....

HARDWARE

COMPUTERS

Corona PC	.....
Sperry PC Mono 256K Dual Drive	.....
Serial Port, Clock, MS/DOS 2.11	.....
IBM PC-AT	.....

IBM PC-AT

IBM PC Clone, 256K, Amber Monitor,	.....
Hercules Graphics Card Equivalent	.....

ITT Computers PC Compatible 256K

Dual Drive, Mono, MS/DOS
--------------------------	-------

ITT XP 80286 IBM/PC Compatible \$12K

10 MB Winchester, 3 times faster than an	.....
XT, 30% faster than an AT	.....

Kaypro 2000 768K

Kaypro 16" w/external color monitor
-------------------------------------	-------

Zenith 171

--	-------

PRINTERS

FREE! PRINTER SET SOFTWARE

Purchase an Okidata, Epson, Gemini, Citizen or Toshiba printer and receive at no charge a menu driven program to set print characteristics or to make your computer function as a correcting typewriter. Retail value \$35. Available for most disk formats.

CITIZEN

MSP-10
--------	-------

MSP-15
--------	-------

MSP-20
--------	-------

Citizen 1200
--------------	-------

Premiere 35 Daisywheel
------------------------	-------

DAISYWHEEL 2000
-----------------	-------

EPSON - Call on all models
----------------------------	-------

JUKI
------	-------

Juk 6100
----------	-------

Juk 6300
----------	-------

NEC
-----	-------

3550
------	-------

3550
------	-------

P5 Parallel
-------------	-------

Eit 360
---------	-------

OKIDATA - Call on all models
------------------------------	-------

PANASONIC
-----------	-------

1091
------	-------

1092
------	-------

1093
------	-------

KXP3151
---------	-------

STAR MICRONICS
----------------	-------

SG-10
-------	-------

SG-15
-------	-------

Call for prices on other models
---------------------------------	-------

TOSHIBA
---------	-------

1340
------	-------

P351
------	-------

P341
------	-------

MONITORS

AMDEK
-------	-------

Taxan 610
-----------	-------

Taxan 121 Grabin
------------------	-------

Taxan 122 Amber
-----------------	-------

Princeton HX-12
-----------------	-------

Princeton Max 12
------------------	-------

--	-------

--	-------

--	-------

--	-------

--	-------

--	-------

--	-------

--	-------

--	-------

--	-------

--	-------

TOLL-FREE ORDER LINE 1-800-421-3135

WAREHOUSE DATA PRODUCTS

2701 West Glendale Ave. • Phoenix, AZ 85021

YPSA

FROM THE EDITOR'S SCREEN

have resident at once? What if two of your favorites both demand to be loaded last? What are the implications of this explosion of DOS helpers for multitasking environments? There should be a more efficient way for processors to share critical interrupts and the timer channel. Specifically, the current crop of products steal interrupts from one another and stack them, so that a malfunction by one program brings the whole mess down like a house of cards. A queue-based system with settable priorities would manage the programs better, assuming that the processor has enough horsepower to do the requisite housekeeping on a keystroke-by-keystroke basis. You should be able to go in from the operating system and kill any resident program that you don't need anymore without messing up the others. Hmmm. This is beginning to sound a lot like UNIX.

On another tack, has anybody thought about doing parallel processing on the PC? You put another 8088 (or whatever) on the memory board and use some shadow-addressing techniques so that a character to

power line glitch or some cosmic rays changed a few bytes while I was installing your program on my hard disk. Who would be competent to judge how the changes got there? Who would care? I'd

like to see this one come up as a test case. It could be the most entertaining thing since the Scopes trial.

Gripes and wish lists. I'd like to hear yours. ■

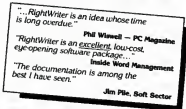
For Your IBM PC or Compatible

Write Right with RightWriter®

THE Intelligent Grammar and Style Checker

RightWriter is a new tool to help you produce lean, powerful BUSINESS WRITING. RightWriter uses advanced artificial intelligence technology to flag errors in GRAMMAR, STYLE, USAGE, and PUNCTUATION. RightWriter is the first office automation package aimed at producing better writing, not more writing.

- **Messages are Inserted** — directly into text to point out possible errors and problem areas.
- **Easy to Use** — only one command to learn, your word processor does the rest.
- **Works with Leading Word Processors** — including WordStar®, Volkswriter®, PFS:write®, MultiMate®, and others.
- **Readability Index** — measures the reading grade level of the document using the D.O.D. standard Flesch-Kincaid formula.
- **Uncommon Word List** — lists misspelled, slang, and uncommon words.
- **Recommendations** — never decides. RightWriter is a writing aid. The final decision is always left to you.



**Price
\$75.00**

Available from your local dealer or:
DECISIONWARE, INC./RightSoft Division
2033 Wood Street • Suite 218 • Sarasota, FL 33577
Phone Orders Call: (813) 952-9211
Add \$3 for shipping and handling.
VISA & MASTERCARD accepted. Dealer inquiries invited. See Licenses Available.

30 Day Money Back Guarantee

RightWriter is a trademark of Decisionware, Inc. WordStar is a trademark of MicroPro International Corporation. MultiMate is a trademark of MultiMate International. PFS:write is a trademark of Software Publishing Corporation. Volkswriter is a trademark of Lerner Software, Inc.

I'm as big a SideKick fan as the next guy, but things have gotten out of hand with RAM-resident DOS enhancement programs.

be processed by both foreground and background tasks show up in two or more places at once. The tasks communicate with one another through the existing interrupt structure and DMA.

Software Agreements

Sorry, advertisers, but I don't think your tear-me-open software agreements can stop me from disassembling your product, or patching it, for that matter. What if I hate the colors you've chosen for the screen and you haven't provided a setup menu? What if you're outputting to ports that send my Enhanced Graphics Adapter into hysterics? You're going to sue, fine, or jail me for "no-opping" a few bytes?

You've heard of serendipity. Maybe a

CIRCLE 474 ON READER SERVICE CARD

2400 BPS MODEMS AT 1200 BPS PRICES! YOUR CHOICE \$439*



FUJITSU 1935D



U.S. ROBOTICS COURIER 2400

1200 and 2400 BPS • HAYES, BELL 212A, V.22 bis, V.24, V.28 compatible • Automatic Dialing and Answering • Both Local and Remote, Digital and Analog Loopback Testing • Operates on Switched or Leased Lines Networks • Full or Half Duplex • Synchronous or Asynchronous

0-300, 1200 and 2400 BPS • HAYES, BELL 212A, V.22 bis, compatible • Automatic Dialing and Answering • Analog Loopback Testing • Auto Speed Selection in Answer Mode • Call Duration Reporting • Call Progress Detection • Modem Status and Help Screens • Full or Half Duplex • Asynchronous

TELE-SOLUTIONS HARD DISK KIT FOR THE IBM PC/XT

**20 MB Internal H/H Kit
\$495**

Multifunction Board Specials
Orchid 384K Blossom Brd \$195
EPD 256K Half-slot Brd \$159

**70 MB Kit for AT w/ Software
\$1995**

Performance Board Special
Orchid 256K PC Turbo 186 \$579*
*Includes RAM daughtercard

****Complete specification and product evaluation literature available****

**CALL TOLL FREE
1-800-468-0613**



**tele-
solutions**

**490 W. WRIGHTWOOD
ELMHURST, ILLINOIS 60126**

**IN ILLINOIS CALL
312-832-2733**

AMEX

**WIRE
TRANSFERS**

OPEN MONDAY THRU FRIDAY 8:30 a.m. to 6:30 p.m. • Saturday 9:00 a.m. to 1:00 p.m. CST

Warranted and Tested Products • No Charge Technical "Hot Line"

Terms: VISA, MASTERCARD, AMERICAN EXPRESS AND WIRE TRANSFERS. Certified Checks, Money Orders, and Company Purchase Orders Accepted Upon Credit Approval • Call for RMA Number on Return Merchandise • Restocking Charge on Unclaimed Orders, or unauthorized returns. Illinois Residents add 6.25% Tax • Minimum Order \$50.00. All prices subject to change and availability of products. *All quoted prices are based on cash sales.

CIRCLE 483 ON READER SERVICE CARD

Letters to PC Magazine

And the Winner Is...

I think *PC Magazine* should establish an award for the most useful hint or program submitted to User-to-User. My nomination is Todd Lewis's CAPLOCK.COM program (*PC Magazine*, Volume 4 Number 21). Forgetting to turn off the CapsLock function is a mistake I have made about a thousand times.

Imagine a program that monitors my keystrokes, notices when I want a capital letter, and says, "The big jerk forgot to turn off CapsLock again, so I'll turn it off for him." CAPSLOCK.COM is much better than the indicator light on the AT's keyboard, because it actually gives me what I want automatically.

Michael Trombetta
Manhasset, New York

Low-Cost Computing

The articles on low-cost software and hardware in the October 15, 1985, issue of *PC Magazine* are excellent (Volume 4 Number 21). There is a clear trend by purchasers either to price shop or to only pay

easy to learn, and includes a dictionary on the system disk. According to the software literature, the *WordPerfect jr* user can also upgrade to *WordPerfect* for a fee. I understand that Satellite Software also offers an intermediary step program.

Similar programs include *WordStar* for *PCjr* and *Easy* from MicroPro and *Just Write* from Multimate. Don't be put off by the reference to *PCjr*. The program might have been designed with the *PCjr* in mind, but it will work on the PC.

Steven J. Barach
Millburn, New Jersey

Thanks, Charlie!

Thanks for Mom, apple pie, cold beer, and Charlie Butrico. The COLOR.COM utility he's written for your User-to-User column is great (*PC Magazine*, Volume 4 Number 19). I have accumulated quite a few commercial and noncommercial programs over the past years, but Butrico's will be one of the most used. Everyone with a color monitor needs this program. There is nothing more discouraging than buying an expensive program and then finding out that it isn't in color.

I was surprised at how many noncolor programs were enhanced by his program. If it didn't completely solve the problem of not having color, it at least colored the border. The program is resident in RAM, is very small, and seems flawless. And Butrico doesn't even give himself credit with a remark statement in the source code. Now that's a real programmer. I've tried several other attempts to get color in DOS, but none of them ever really worked. I've installed COLOR.COM in the AUTOEXEC.BAT file on nearly all my disks.

Your User-to-User, Programming, PC Tutor, and the new Power User columns are what keeps me subscribing to *PC Magazine*. Butrico's program is worth my entire subscription for this year. Keep up the good work, and I hope I hear more from Mr. Butrico.

Les Horton, Sr.
King William, Virginia

Correct Chip Number

I'd like to correct an error in Peter Feldmann's sidebar to his article "Upgrading Your 64K PC" ("A New BIOS

Chip for an Old PC," *PC Magazine*, Volume 4 Number 20). The Fact File has number 6137800 as the part number of the chip. In fact, that is the part number for the instruction manual. The upgrade kit

(which includes the manual and a chip puller as well as the BIOS chip) is part number 1501005. The error is not surprising, since the correct part number appears only on the outside of the box, which is otherwise remarkably nondescript for a PC component sold directly by IBM.

Mark J. Eisner
South Orange, New Jersey

Paradoxical Parody

I was delighted to read Stephen Manes's parody of the "see-I-told-you-personal-computers-are-only-a-fad" features that, incredibly, still appear in the media from time to time ("Eavesdropping at the PC Party," *PC Magazine*, Volume 4 Number 22). My only quarrel with the piece is that the resemblance to what is being parodied is often so strong that some readers might actually think that Manes might want to be taken seriously.

Lest anyone mistake Manes's meaning, he must be aware that small claims courts in most states have sufficiently high limits to allow plaintiffs to collect the proceeds of an action against a dealer who refuses to accept return and offer replacement of a nonworking drive. Anyone too lazy to take such a relatively simple step, when all else has failed, does not deserve to have his complaints listened to at the "PC Party" or anywhere else.

Manes also appears to sympathize with software pirates who, like drug users, of-



top dollar for superior products.

Looking at inexpensive word processors, you should note the number of entry-level products offered by firms specializing in the more powerful versions. One could argue that *DisplayWrite 1*, to which the article "Word Processing for the Dollar-Wise" gave good marks, falls into this category since *DisplayWrite 2* was released at about the same time.

WordPerfect jr is an excellent example. While lacking many of the unique features found in its big brother, it's equally as fast,

COMPLETE SYSTEMS

(Optional local warranty service available in most major metro areas)

IBM PC BASE SYSTEM

IBM PC w/256K

Floppy Drive Controller
2 Double Sided Double
Density Disk Drives
Mix and Match with
your Favorite Monitor
and Printer!

\$1,495.02*

CALL FOR
LATEST IBM
ANNOUNCEMENTS



IBM PC HARD DISK SYSTEM

IBM PC w/256K

Floppy Drive Controller
1 Double Sided Double
Density Disk Drive
Half Height 10MB
Disk Subsystem

\$1,749.00*

CUSTOM
CONFIGURATIONS
WELCOME

COMPAQ™

PORTABLE HARD DISK SYSTEM

w/256K/1 Floppy/Hard Disk



\$2,235.00* w/10MB
\$2,369.00* w/20MB

DESKPRO SYSTEM WITH TAPE BACKUP

640K CPU/1 Floppy/Hard Disk
10MB Tape Drive/Monitor



\$2,951.94* w/10 MB
\$3,151.94* w/20MB

Wholesale Prices Change Rapidly...if you ever see a lower price advertised anywhere please call! You will find the Network's Price will always be the best!

64K IBM PC MEMORY EXPANSION KITS

Quantity Discounts Available.
Guaranteed for Life!



Quantity of 100 Sets
\$3.96* per set
Set of 9 Chips
\$5.40*

DISKETTES

Guaranteed for Life!

Brand name diskettes available in boxes of 10 or in bulk packs of 50

5 1/4 DS/DD
\$8.95*
5 1/4 SS/DD
\$7.95*

1/2 HEIGHT DS/DD DISK DRIVES



The Network buys direct and makes fantastic deals with manufacturers like Tandon/CDC/Shugart/Quantum/TEAC/Hi-Tech and others to bring you fantastic prices on Name Brand drives for your PC/AT/XT/Pro/Compatible.

\$59.00*

Quantity Discounts Available

INTERNAL PC HARD DISK

Low Power/Automatic Boot Works on standard PC's and Compatibles. Includes drive/controller/cables/mounting hardware and instructions.

Full one year warranty!



10MB
\$330.00*
20MB
\$420.00*

Quantity Discounts Available

\$285.00*

Recent Price Increase by Lotus

WordPerfect
\$190.00*
MultiMate™

*Members pay 8% above this wholesale price plus shipping.

CALL TOLL FREE 1-800-621-S-A-V-E (orders and memberships)

In Illinois call (312) 280-0002 Validation code: A167

TM—Registered trademark of IBM and COMPAQ

NETWORK

... WITH THESE 15 UNIQUE BENEFITS

1 COST + 8% PRICING—The NETWORK purchases millions of dollars in merchandise each month. You benefit in receiving the lowest price available and all at just 8% above published dealer wholesale price.

2 OUR 600 PAGE WHOLESALE CATALOG—Members receive our 600 page wholesale catalog containing over 30,000 hardware and software products for the IBM PC, APPLE and over 50 other popular computer systems. The NETWORK'S CATALOG IS THE LARGEST SINGLE COMPILATION OF PERSONAL COMPUTER PRODUCTS AVAILABLE TODAY. NOW UPDATED QUARTERLY!

3 IN-STOCK INSURED FAST HOME DELIVERY—The NETWORK maintains a giant multi-million dollar inventory of most popular products, allowing us to ship many orders from stock. Non-stock items are typically maintained in local warehouses just days away from The NETWORK and YOU. We pay all insurance expenses on your shipment. EMERGENCY OVER-NIGHT SERVICE IS AVAILABLE ON REQUEST.

4 10 DAY RETURN POLICY—If you are not satisfied, for any reason with any hardware component purchased from The NETWORK within 10 days of receipt, we will refund your entire purchase (less shipping) with no questions asked.

5 MEMBERSHIP SATISFACTION GUARANTEE—If for any reason you are not satisfied with your membership within 30 days, we will refund your dues IN FULL.

6 EXPERIENCED CONSULTANTS—The NETWORK hires consultants, not order takers, to aid you in product selection. Our consulting staff possesses in excess of 150 years of personal computer product experience. We back our consultants with our money back guarantee: IF ANY PRODUCT RECOMMENDED BY OUR CONSULTING STAFF FAILS TO PERFORM AS PROMISED—WE WILL TAKE IT BACK AT OUR EXPENSE FOR A 100% REFUND.

7 FREE TECHNICAL SUPPORT—The NETWORK supports every product it sells. Our qualified TECH-SUPPORT staff will help you assemble your system, interpret vendor documentation and get your software and hardware to work. WE WILL GIVE YOU ALL THE HELP YOU NEED, WHEN YOU NEED IT—FREE!

8 OPTIONAL BUSINESS RENTAL LIBRARY—All members can join our BUSINESS RENTAL LIBRARY featuring over 1000 available titles for just \$25 PER YEAR above the base membership fee. This entitles you to rent business software AT JUST 20% OF THE DISCOUNT PRICE FOR A 14 DAY PERIOD. If you decide to keep the software, the entire rental fee is deducted from the purchase price. VIP MEMBERS GET A FULL 30 DAYS for just \$30 above the V.I.P. base fee. This also includes the game library privilege for a \$5 combination savings.

9 OPTIONAL GAME SOFTWARE RENTAL LIBRARY—The Game Rental Library is available to members for just \$10 PER YEAR and permits evaluation (or just enjoyment) of any game or educational software product as above.

10 SPECIAL SAVINGS BULLETINS—THE PRINTOUT—Issued Quarterly at no charge to Network members only! The Printout contains all the New Product listings and price changes you need to keep your Catalog up to date. Also, we buy excess dealer inventories, and store bankruptcy closeouts, which we turn around and make available to our members at fantastic savings via THE PRINTOUT.

11 DISCOUNT BOOK LIBRARY—Working with numerous publishers and distributors, The NETWORK has assembled a library of over 1000 computer related books and manuals at savings of up to 75% from the normal store price.

12 MEMBERSHIP REFERRAL BONUS—Our most valuable source of new members is you! To date almost 40% of our members have been referred by word of mouth from other satisfied members. For those of you who refer new members, The NETWORK will credit a cash bonus to your account applicable to any future purchase.

13 CORPORATE ACCOUNT PROGRAM—Almost 50% of The NETWORK's members are corporate buyers and users (see opposite page ref). The NETWORK can establish open account status and assign designated account managers to expedite orders, and coordinate multiple location shipments.

14 QUANTITY DISCOUNTS—For large corporations, clubs, and repeat or quantity buyers The NETWORK can extend additional single order discounts, when available to us from our manufacturers and distributors.

15 PRICE PROTECTION—The PC industry is crazy! Prices change not yearly or monthly or even weekly but often daily. These changes are caused by word of mouth from other satisfied members. The NETWORK GUARANTEES THAT IN THE EVENT OF A PRODUCT PRICE REDUCTION, BETWEEN THE TIME YOU PLACE YOUR ORDER AND THE TIME THE PRODUCT SHIPS YOU WILL ONLY PAY THE LOWER AMOUNT!!

PC NETWORK GOES TO THE

ORIENT DIRECT

How do you suppose most manufacturers of personal computer products got started?

They go to the Orient... taking either their designs or simply their ideas to one or more of the major electronics manufacturing concerns, getting bids for making these devices under contract to the creators. Multifunction Cards, Video Cards, Disk Controllers, Modems and I/O Boards all begin their life in this way.

This relationship between the manufacturing capabilities of the East and the design and marketing talents of the U.S. has resulted in the incredible selection of enhancement products for the IBM and Apple computer markets.

Well, with 100,000 members and growing strong, The Network sent its buyers east to visit some of these manufacturing

concerns to check out the feasibility of directly importing these products in the necessary volumes to *save our members money!* What they came back with was astounding.

Now, we always figured that there were some pretty substantial markups as these boards came into the country and got fancy boxes and marketing promotions under any one of a number of well known brand names in the peripheral add-on markets *but we had no idea they were so large!*

To prove our point, consider what they brought back. Each board is constructed to the same precise specifications, on exactly the same machinery as their name-brand duplicates. The difference? *As a Network member, you pay only 8% over our unusually low wholesale price... and you get our full 1 year warranty!*

Hercules' Smarter Brother

A Monochrome Graphics Card with Printer Port... 100% compatible with Hercules product...



Wholesale price...
\$99.00*

Graphics Printer Interface

If all you want is a printer, this is the card for you. Supports all text and graphics printer features.

Wholesale price... **\$29.00***



The "9" Pack Plus

Multifunction like the AST "6" Pack... up to 384Kb of expansion memory, 1 serial, 1 parallel, and 1 game port, a clock/calendar and 3 software packages standard.



With 0 K...
\$89.00*
Wholesale

IBM Color Card

100% compatible with the IBM offering. The wholesale price?



A mere **\$69.00***

The I/O Double Plus

If you don't need memory—just ports, identical I/O board to the AST I/O+ with 2 serial, (1 standard) 1 parallel, 1 game port and clock/calendar with software.



Wholesale price...
\$69.00*

512 K Memory

The least expensive way to add memory to your current system. With 0 K installed.



Wholesale priced at only...
\$69.00*

Watch our Network ONLINE listings for new products in this ORIENT DIRECT line for the Apple II and IBM AT computer families.

*PC NETWORK Members pay just 8% above this wholesale price, plus shipping. All prices reflect a 3% cash discount. Minimum shipping \$2.50 per order. International orders call for shipping & handling charges. Personal checks, please allow 10 working days to clear.

CALL TOLL-FREE 1-800-621-SAVE In Illinois Call (312) 260-0002

PC NETWORK

GET THE NETWORK ADVANTAGE!!!

LETTERS TO PC MAGAZINE

ten blame others and extenuating circumstances for their own actions. The quote "They made me a criminal" is so clearly ironical that Manes's intention is once again manifest. But the put-down of computer buyers who are shocked to discover that they are expected to mark their printer cables to avoid confusion, then find out they actually have to learn something in order to have desktop computing power comparable to one of the mainframes that guided Armstrong and Aldrin to the moon, was simply priceless.

I'd like to see more of this sort of article from Manes, but to avoid this kind of confusion in the future, please ask him to touch up on his satirical style first.

David P. Babcock
Minneapolis, Minnesota

Greek Translation

I enjoyed reading John Dickinson's Programming column "Getting Graphics to Speak ASCII" (*PC Magazine*, Volume 4 Number 19). I successfully made PRSWAP.COM run as written, but it does not work with my Gemini 10X printer using *Microsoft Word*.

I made sure that PRSWAP.COM ran when I booted the system and that it was

Thanks for Mom, apple pie, cold beer, and Charlie Butrico. The COLOR.COM utility he's written for your User-to-User column is great. Everyone with a color monitor needs it.

resident in memory. However, the text graphics code still gives me the same strange symbols as it did without PRSWAP.COM.

I'd like to get some advice on using Greek letters and symbols in my word processing program and having these characters printed with my printer. By the way, my *Word* can show the full IBM ASCII character set on the screen.

Choon Geol Moon
Stanford, California

ON-LINE HELP for DOS only \$29*



DOS-Helper is an ON-LINE Help System for DOS. With DOS-Helper you no longer have to scramble for the DOS manual because it is on your disk, easily accessed at any time.

FEATURES

- Both standard and **MEMORY RESIDENT** versions included.
- Complete & clear information, including examples, for all DOS & Debug commands, and most other topics in the manual.
- Easily add **YOUR OWN** help files, for any topic.
- For PC, XT, AT & compatibles. Requires DOS 2.00 & up. Any 80x25 screen. Min 128k & 1 disk drive.

General help system also available for software developers.

30 DAY UNCONDITIONAL MONEY BACK GUARANTEE!

Ordering information:
• \$29 + \$3 S&H Chk. Visa MC
• Texas +6% tax Outside USA + \$4
• Site licensing available
• Dealer inquiries welcome

ARISTO SOFTWARE
16811 El Camino Real
Suite 213 R
Houston, TX 77058
1-(800) 3ARISTO or
(713) 480-6788

DOS-Helper™

* Special Introductory Price

Try It. Then Buy It. PC-Write.™

A fast, full-featured word processing package for the unbelievable price of \$10. Complete. You get a manual on disk, mail merge, split screen, keyboard macros, on-screen formatting, full printer support, and more.

Try PC-Write for \$10.

Then register for \$75 to get:

- latest diskette
- printed manual
- two updates
- phone support
- newsletter

Registration supports our "shareware" concept that keeps our prices low, and allows our development of PC-Write enhancements.

Shareware means you can get PC-Write from a friend or user group to try, and give away copies yourself. Then register if you like it. No risk!

PC Magazine
Dec 24, 1985
Read about
PC-Write in

"Word Processing Power", in
PC Magazine, Jan 15, 1986.
Watch for version 2.6 soon.



A perfect Christmas gift!
We'll send it and include
a nice card in your name.

Order PC-Write Today.
Satisfaction Guaranteed.

Quicksilver
(206) 282-0452

219 First N. #224v
Seattle, WA 98109



Capture the present. Command the future.

Primavera Project Planner gives successful project managers the three things they want most...control, control, control. What they like, you'll like...

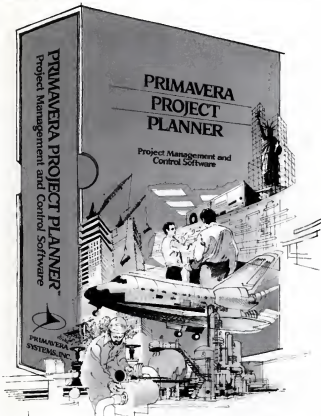
Our capability for managing projects up to 10,000 activities. Resource leveling and cost management. The ability to compare current schedules to targets and to perform "what-if" analysis.

Plus, standard and custom reports to give you the who, what, when, where and why in virtually any format you need.

You can even produce high quality bar charts and network logic diagrams using our optional graphics package, Primavision.

Interested? Contact us for more information or the name of a nearby Primavera dealer.

Primavera Project Planner...the most project management you can get from a micro.



PRIMAVERA SYSTEMS, INC. Suite 925 • Two Bala Plaza
Bala Cynwyd, PA 19004 • (215) 667-8600 • Telex 910 997 0484

LETTERS TO PC MAGAZINE

John Dickinson replies:

Since you didn't say which Word printer driver (.PRD file) you are using, it's difficult for us to give you a solution to your problem. However, it should help you to know that Microsoft Word's designers allowed for a character translation table in the .PRD files. Since these tables perform much of the function of PRSWAP, it's possible that the printer driver you are using makes PRSWAP unnecessary or somehow defeats its function.

You can modify your .PRD file easily.

You have hit a responsive chord by covering the cost-conscious side of computing. Everyone feels happy to find a bargain, but no one wants to buy a bargain-priced white elephant.

See the CONVP.DOC document file on the Word utility disk to find out how—and keep an eye on PC Magazine's Power User column for useful tips on modifying these files.

A Place in Computing

You have hit a responsive chord by covering the cost-conscious side of computing (*PC Magazine*, Volume 4 Number 21). Thanks for a very useful and well-assembled issue. Everyone feels happy when he has found a bargain, but no one wants to be the sucker who's bought a bargain-priced white elephant. You and your reviewers have picked a really good sample of useful and cost-effective products for us.

On another subject, I notice that *PC Magazine* has a new column written by Stan Augarten. When I read his first article I questioned your editorial sense. Augarten's ideas seemed to be totally out of place in a technical, business-oriented publication with a heavy emphasis on hardware and software reviews. As a matter of fact, I silently vowed not to take the time to read his column until I had finished everything else in each issue. Then, after reading "Expressions of Change" (Vol-

"We will match any mail order price in this issue."



William F. Goran
President, BCP

ume 4 Number 21), I suddenly realized we were rounding out an empty place in the business and professional computing world and offering your readers some insight into how software and hardware might be dominating us! Augarten's observations on problem solving and group interactions, both with and without computers, were a revelation to me. You have certainly found an important element of our electronic environment by including Augarten's insights. Needless to say, I won't hold to my promise to relegate his column to last place.

O.J. Zuniga, Jr.
Laredo, Texas

Corrections:

The correct phone number for Lattice Inc., manufacturers of the Lattice C compiler, is (313) 858-7950 ("Programming Makes Sense for Business," *PC Magazine*, Volume 4 Number 22, page 158). On that same page, the photo shown for the Lattice C Lifeboat Associates' version of the program, which is distributed by Lattice Inc. Lattice Inc. also distributes its own version of Lattice C.

Natural Microsystems Corp.'s Watson integrated voice/data modem now retails for \$698, not \$300 as reported in *PC News*, *PC Magazine*, Volume 4 Number 22, page 43.

An incorrect phone number was listed in the Fact File for *The Grafix Partner*. The correct phone number for Brightbill-Roberts, manufacturers of the program, is (800) 447-4700 ("A Partner in Graphics," *PC Magazine*, Volume 4 Number 20, page 142).

How to Write to PC Magazine

Do you have a comment, compliment, or criticism about something you've read in *PC Magazine*? Is there a question you'd like to open up to other readers? Send it to Letters to *PC Magazine*, *PC Magazine*, One Park Avenue, New York, NY 10016. We regret that we are not able to answer letters personally.

All letters become the property of *PC Magazine* and may be subject to editing. We cannot print letters that do not include a name and an address.

We'll support, service and warranty everything we sell and stand behind it 100%. We won't charge you for shipping or handling, nor will we penalize you for using a credit card

MODEMS

D.C. Hayes	370.95	Acad-Video	230.95
Smartmodem 1200 B	370.95	Modem 1200 white	230.95
Smartmodem 1200 B with	370.95	Modem 1200 white	230.95
Smartmodem 1200 B	370.95	Modem 1200 white	230.95
Smartmodem 1200 B	370.95	Modem 1200 white	230.95

PERIPHERAL CARDS & ACCESSORIES

AST	180.95	PC Net Starter (share)	180.95
Adventurer 286	180.95	PC Turbo 160 W/56	180.95
Adventurer 286 with	180.95	Conquest 286	180.95
Adventurer 286 with	180.95	Conquest 286	180.95
Adventurer 286 with	180.95	Conquest 286	180.95

BUSINESS SOFTWARE

Software Group	339.95	SuperCalc v 2.0	164.95
Software Publishing	339.95	SuperProject v 3.1	164.95
Software Publishing	339.95	MACTA, ADVANCE (T)	164.95
Software Publishing	339.95	MACTA, ADVANCE (T)	164.95

WORD PROCESSING

WordPerfect	344.95	WordPerfect 1.1	344.95
WordPerfect	344.95	WordPerfect 1.1	344.95
WordPerfect	344.95	WordPerfect 1.1	344.95
WordPerfect	344.95	WordPerfect 1.1	344.95

UTILITY & LANGUAGE SOFTWARE

Additional Weekly	94.95	Macro	34.95
Additional Weekly	94.95	Macro	34.95
Additional Weekly	94.95	Macro	34.95
Additional Weekly	94.95	Macro	34.95

Paradyt Games	369.95	Paradyt Games	369.95
Paradyt Games	369.95	Paradyt Games	369.95
Paradyt Games	369.95	Paradyt Games	369.95
Paradyt Games	369.95	Paradyt Games	369.95

Paradyt Games	369.95	Paradyt Games	369.95
Paradyt Games	369.95	Paradyt Games	369.95
Paradyt Games	369.95	Paradyt Games	369.95
Paradyt Games	369.95	Paradyt Games	369.95

PRINTERS

Canon	374.95	Canon	374.95
Canon	374.95	Canon	374.95
Canon	374.95	Canon	374.95
Canon	374.95	Canon	374.95

BUSINESS SOFTWARE

Acad-Video	230.95	Acad-Video	230.95
Acad-Video	230.95	Acad-Video	230.95
Acad-Video	230.95	Acad-Video	230.95
Acad-Video	230.95	Acad-Video	230.95

Paradyt Games	369.95	Paradyt Games	369.95
Paradyt Games	369.95	Paradyt Games	369.95
Paradyt Games	369.95	Paradyt Games	369.95
Paradyt Games	369.95	Paradyt Games	369.95

GAME & EDUCATIONAL

Paradyt Games	369.95	Paradyt Games	369.95
Paradyt Games	369.95	Paradyt Games	369.95
Paradyt Games	369.95	Paradyt Games	369.95
Paradyt Games	369.95	Paradyt Games	369.95

CD-ROM

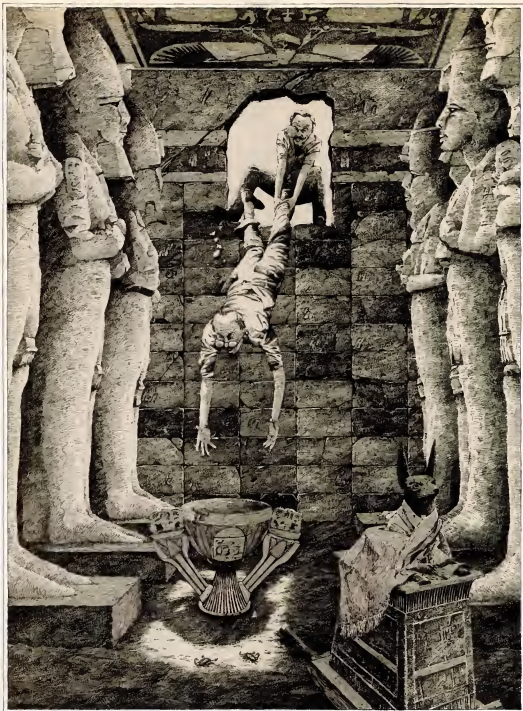
Paradyt Games	369.95	Paradyt Games	369.95
Paradyt Games	369.95	Paradyt Games	369.95
Paradyt Games	369.95	Paradyt Games	369.95
Paradyt Games	369.95	Paradyt Games	369.95

BUSINESS COMPUTERS
 OF PETERBOROUGH
 Colton Co., Inc.

FREE SHIPPING
 CONTINENTAL
 USA/US ONLY

766 RT 101 W • PO Box 389 • Peterborough, NH 03458
 800-845-3003

QUESTIONS 800-929-9406



COMMON SENSE IN DATABASE MANAGEMENT
NUMBER FOUR IN A SERIES

IT DOESN'T MATTER HOW GOOD IT IS IF YOU CAN'T GET YOUR HANDS ON IT

Buried deep in your company, there's an incredible source of wealth. People have spent thousands of hours creating it, one painstaking step at a time.

Then they store it in places where it'll never see the light of day. As you know, we're talking about data.

Because in most companies, the information you need to build a database is locked up in the corporate mainframes, minis and micros. Stored on hundreds of tapes and floppy disks. In a dozen different programs. And with most database software for PCs, the only way to put all this information together is to key it in stroke by stroke. Or write a different program for every data transfer. Unless you've got R:base™ 5000.

ACCESSIBLE DATA

Using R:base 5000, it's possible to transfer data from any of the following popular programs and files. Instantly Using dBASE III™ it's not nearly as easy.

Automatic Data Transfer From	R:base 5000	dBASE III
Lotus 1-2-3®	Yes	No
ps file®	Yes	No
dBASE III®	Yes	Yes
Multiplan® (Syk)	Yes	No
Viscak® (Df)	Yes	No
ASCII (delimited and fixed files)	Yes	No

AUTOMATIC DATA TRANSFER. ONLY WITH FILEGATEWAY™

With some DBMS software, you have to spend 90% of your time copy-

ing data that's already been keyed in somewhere else. But R:base 5000 has a FileGateway™ feature. Which lets you transfer information from all the programs listed in this chart. Automatically, without programming. Without even defining a file structure. All you do is follow a simple menu.

As a result, you can build a database with thousands of records in about the same time it takes to copy a disk.

And once you've got all that data in R:base 5000, you can really put it to good use. Because it lets you develop applications ten times faster; runs 60% to 150% faster; and gives you a much more sophisticated report writer than dBASE III.

SEE FOR YOURSELF:

1-800-547-4000.

If you believe in common sense as much as we do, you'll want to try it out and see for yourself. So for only \$9.95 (plus shipping) we'll send you a mini-version of the product that lets you build real applications.

Just call 1-800-547-4000 and ask for Dept. 846. From Oregon, or outside the U.S., call 1-503-684-3000, Dept. 846. We'll send you your copy right out. If you'd like to see R:base 5000 today, head straight for a leading software store or computer dealer.

And see what it's like to get your hands on a little satisfaction for a change.



R:BASE 5000 FROM MICRORIM

IT ALL COMES DOWN TO COMMON SENSE.

**RUNTIME VERSION
NOW AVAILABLE**

THE CMO ADVANTAGE

- ✓ THE BEST PRICES!
- ✓ Next day shipping on all in stock items.
- ✓ Free easy access order inquiry.
- ✓ Orders from outside Pennsylvania save state sales tax.
- ✓ Free technical support with our factory trained technical staff.
- ✓ There is no limit and no deposit on C.O.D. orders.
- ✓ There's no extra charge for using your credit card. Your card is not charged until we ship.
- ✓ No waiting period for cashiers checks.
- ✓ We accept purchase orders from qualified corporations. Subject to approval.
- ✓ Educational discounts available to qualified institutions.
- ✓ FREE CATALOG MEMBERSHIP

ORDER LINE

CALL TOLL-FREE
1-800-233-8950
CUSTOMER SERVICE & TECH SUPPORT
1-717-327-1450

Dept. B112

MAILING ADDRESS

Computer Mail Order
Dept. B112
 477 East Third Street
 Williamsport, PA 17701



MEMBER DIRECT MARKETING ASSOCIATION

CREDIT CARDS



SHIPPING

Add 3%, minimum \$5.00 shipping and handling on all orders. Larger shipments may require additional charges.

All items subject to availability and price change.

Returned shipments may be subject to a restocking fee.

CANADIAN ORDERS

1-800-268-3974
 Ontario/Quebec

1-800-268-4559
 Other Provinces

1-416-828-0866
 In Toronto

TELEX: 06-218960

2505 Dunwin Drive,
 Mississauga, Ontario
 Canada L5L1T1

All prices shown are for U.S.A. orders.
 Call The Canadian Office for Canadian prices.

DRIVES

HARD ALLOY

PC Stor.....CALL	
PC Disc.....CALL	
PC QIC Stor.....CALL	
PC Back-Up.....CALL	

II-SGI

10 meg Internal (IBM).....\$429.00	
20 meg Internal (IBM).....\$569.00	

MEGA

10 meg Bernoulli Box.....\$1899.00	
20 meg Bernoulli Box.....\$2999.00	

TECHNICAL SUPPORT

12, 25, 35, 50, 80 meg (PC).....\$1499.00	
---	--

IRWIN

Tape Backup.....CALL	
----------------------	--

EVEREX

50 meg Internal Backup.....\$879.00	
20 meg AT Internal Streamer.....\$899.00	

FLOPPY

Tandon

320K 5 1/4".....\$109.00	
--------------------------	--

TEAC

320K 5 1/4".....\$109.00	
--------------------------	--

MODEMS

ANCHOR

Volkamodem.....\$59.99	
Volkamodem 300/1200.....\$189.99	
Sigaram Express.....\$299.00	
Lightning 2400 Baud.....\$399.00	

Hayes

Smartmodem 300.....\$139.00	
Smartmodem 1200.....\$369.00	
Smartmodem 1200B.....\$359.00	
Smartmodem 2400.....\$599.00	
Smart Com II.....\$69.99	
Chronograph.....\$199.00	
Transtel 1000.....\$399.00	

EVEREX

1200 Internal software.....\$199.00	
-------------------------------------	--

AST

Reach 1200 Baud Half Card.....\$399.00	
--	--

Novation

J-Cart.....\$99.99	
Smart Cat Plus.....\$319.00	
Novation 2400.....\$499.00	

QUADRANT

Quadmodem II.....\$339.00	
300/1200/2400.....\$499.00	

INTERFACES

ADAPTEC

Microbuffer.....\$199.00	
--------------------------	--

QUADRANT

Microfazer.....\$139.00	
Elkizer (Epson).....\$79.99	

DIGITAL DEVICES

Printer Buffer 16K.....\$74.99	
--------------------------------	--

GRAPHICS

Koala

Koala Pad w/Inkjet Printer.....\$69.99	
--	--

MICROPHONICS

Prosounder.....\$119.00	
Speech Input System.....\$399.00	

Polaroid

Palette.....\$1299.00	
-----------------------	--

MONITORS

AMDEK

300 Green.....\$129.00	
300 Amber.....\$139.00	
310 Amber IBM Plug.....\$189.00	
Color 300 Composite.....\$179.00	
Color 500 Composite/RGB.....\$269.00	
Color 600 Hi-Res (640x240).....\$399.00	
Color 700 Hi-Res (720x240).....\$419.00	
Color 710 Long Phosphor.....\$499.00	
Color 722 IBM Enhanced.....\$559.00	

NAD

12" Amber/Green Comp. (ea.).....\$99.99	
12" Amber/Green TTL (ea.).....\$119.00	

NEC

JB 1250 Green.....\$59.99	
JB 1270 Green/1275 Amber(ea).....\$119.00	
JB 1275.....\$149.00	
JB 1260 G TTL/1265 A TTL(ea).....\$149.00	
JC 1225 Composite Color.....\$179.00	
JC 1460 Color RGB.....\$269.00	
JC 1410 Color RGB.....\$669.00	

PRINCETON

MAX-12E Amber.....\$179.00	
HX-9 9" RGB.....\$469.00	
HX-9E Enhanced.....\$519.00	
HX-12 12" RGB.....\$469.00	
HX-12E Enhanced.....\$559.00	
SR-12 Hi-Res.....\$599.00	
SR-12P Enhanced.....\$649.00	

TAXAN

121 Green TTL.....\$139.00	
122 Amber TTL.....\$149.00	
420 Hi-Res RGB (IBM).....\$429.00	
440 Ultra Hi-Res RGB.....\$559.00	

QUADRANT

8400 Quadchrome.....\$479.00	
8410 Quadchrome II.....\$429.00	
8420 Amberchrome.....\$179.00	
8500 Quad Screen.....\$1499.00	

ZENITH

ZVM 1220/1230.....(ea.) \$99.99	
ZVM 1240 IBM Amber.....\$149.00	
ZVM 131 Color.....\$249.00	
ZVM 133 RGB/Color.....\$429.00	
ZVM 135 RGB/Color.....\$459.00	
ZVM 136 RGB/Color.....\$599.00	

DISKETTES

maxell.

3 1/2" SS/SD.....\$29.99	
3 1/2" DS/DD.....\$39.99	
5 1/4" MD-1 w/Hardcase.....\$14.99	
5 1/4" MD-2 w/Hardcase.....\$19.99	
5 1/4" MD-2 HD for AT.....\$39.99	

Verbatim.

5 1/4" SS/DD.....\$19.99	
5 1/4" DS/DD.....\$24.99	
Disk Analyzer.....\$24.99	

Dennison

Elephant 3 1/2" SS/DD.....\$29.99	
Elephant 5 1/4" SS/SD.....\$13.99	
Elephant 5 1/4" SS/DD.....\$15.99	
Elephant 5 1/4" DS/DD.....\$19.99	
Elephant Premium DS/DD.....\$22.99	

IBM

5 1/4" DS/DD Floppy Disks (box of 10).....\$25.99	
---	--

DISK HOLDERS

INNOVATIVE CONCEPTS

Flip-in File 10.....\$3.99	
Flip-in File 50.....\$17.99	
Flip-in File 50 w/lock.....\$24.99	
Flip-in File (400/800 ROM).....\$11.00	
Flip-in File 100.....\$24.99	

AMARAY

50 Disk Tub 5 1/4".....\$9.99	
30 Disk Tub 3 1/2".....\$5.99	

PRINTERS

Canon

A40.....CALL	
LBP-8A1 Laser.....CALL	

CITIZEN

MSP 10 (80 cps).....\$279.00	
MSP 15 (132 cps).....\$309.00	
MSP 20 (80 cps).....\$349.00	
MSP 25 (132 cps).....\$509.00	

CITIZEN

Prowriter 7500.....\$219.00	
Prowriter 8510 NLO.....\$309.00	
Prowriter 1550.....\$449.00	
Starwriter 10-30.....\$459.00	

corona

Lazer LP-300.....\$2799.00	
----------------------------	--

DIABLO

D25 Datasheet.....\$549.00	
630-109 Datasheet.....\$1749.00	
D601F Datasheet.....CALL	

daisywriter

2000.....\$749.00	
-------------------	--

EPSON

Rx100, LX 80.....CALL	
FX 45, FX 165.....CALL	
LQ 1050, JX80 Color.....CALL	
Homeprinter 10, HS 80.....CALL	
NEW! LX 90, SO-2000, DX-10, DX-20, DX-35.....CALL	

LUKI

8000 Letter Quality.....CALL	
8100 Letter Quality.....CALL	
8200 Letter Quality.....CALL	
8300 Letter Quality.....CALL	

LEGEND

808 Dot Matrix 100 cps.....\$179.00	
1080 Dot Matrix 100 cps.....\$259.00	
1380 Dot Matrix 130 cps.....\$309.00	
1385 Dot Matrix 165 cps.....\$399.00	

NEC

8027 Transportable.....\$229.00	
2000 Series.....\$699.00	
3000 Series.....\$1099.00	
6000 Series.....\$1499.00	
ELF 386.....\$449.00	
Prowriter 580.....\$999.00	

OKIDATA

92, 93, 162, 163, 192, 193, 64, 210, Okimate 20.....CALL	
--	--

Panasonic

KX1091.....\$259.00	
KX1092.....\$369.00	
KX1093.....\$479.00	

QUADRANT

Quadjet.....\$399.00	
Quadcolor.....CALL	

SILVER-REED

550 Letter Quality.....\$279.00	
550 Letter Quality.....\$419.00	
770 Letter Quality.....\$759.00	

star

SB/SD/SG/SR.....CALL	
Powertype Letter Quality.....CALL	

Texas Instruments

T1650.....\$129.00	
T1655.....\$239.00	
T1656.....\$799.00	

TOSHIBA

1340 (80 Column).....\$569.00	
P341.....\$999.00	
P351 (132 Column).....\$1149.00	

CALL TOLL-FREE

HEXACE

Mid Res RGB Color
Card for IBM PC

\$99.99

SOFTWARE FOR IBM

ASHTON-TATE ■		MICROSOFT	
Framework II.....	CALL	R Base 4000.....	\$249.00
dBASE II.....	\$299.00	R Base 5000.....	\$389.00
dBASE III.....	\$369.00	Clout 2.0.....	\$129.00

BORLAND ■		MICROSOFT	
Turbo Pascal 3.0.....	\$49.99	Flight Simulator.....	\$39.99
Superkey.....	\$44.99	MultiPlan.....	\$129.00
Sidelock (Unprotected).....	\$59.99	Microsoft Word.....	\$229.00
Reflex.....	\$64.99	Microsoft Project.....	\$159.00
		Microsoft Chart.....	\$159.00
		Microsoft Mouse.....	\$139.00

CENTRAL POINT		MICROSOFT	
Copy II PC-Backup.....	\$29.99		

Continental Software		MultiMate	
Home Accountant Plus.....	\$79.99	Crosstalk XVI.....	\$89.99
1st Class Mail.....	\$79.99	Crosstalk Mark IV.....	\$149.00
		Remote.....	\$89.99

DECISION RESOURCES		MultiMate	
Charismatic.....	\$229.00	Multi Mate.....	\$249.00
Signmaster.....	\$169.00	Advantage.....	\$299.00
Digram Master.....	\$229.00		

FIFTH GENERATION		THORNTON UTILITIES	
Fastback.....	\$109.00	Peachtree 5000.....	\$169.00
		PeachTree (GL/AP/AP).....	\$199.00

FIRST STEP		THORNTON UTILITIES	
Golf's Best.....	\$34.99	Norton Utilities (IBM).....	\$59.99

ENERGETICS RESEARCH		IBM	
Energistics/Plotter.....	\$299.00	Access.....	\$79.99
		File/Graph.....	(ea) \$79.99
		Report.....	\$74.99
		Plan.....	\$79.99
		Write/Proof combo.....	\$79.99

FUNK SOFTWARE		IBM	
Sideways.....	\$39.99	Access.....	\$79.99

Harvard Software Inc.		IBM	
Harvard Project Manager.....	\$205.00	Access.....	\$79.99
Total Project Manager.....	\$259.00	File/Graph.....	(ea) \$79.99
		Report.....	\$74.99
		Plan.....	\$79.99
		Write/Proof combo.....	\$79.99

Hayes		Professional Software	
Please (Data Base).....	\$199.00	PC Plus/The Boss.....	\$249.00

IBM		RoseSoft	
PC Paintbrush.....	\$89.99	Pro Key.....	\$69.99
PC Mouse/Paint.....	\$139.00		

INFOCOM		SOFTWARE GROUP	
Witness.....	\$29.99	Enable.....	\$339.00
Enchanter.....	\$29.99		
Mind Voyaging.....	\$34.99		
Hitch Hiker.....	\$29.99		
Out Throat.....	\$29.99		
Zork 1, 2, 3.....	\$27.99		
Wishbringer.....	\$29.99		
Cometstone.....	CALL		

LIFETIME		SM	
Volkswagen Deluxe.....	\$159.00	Open Access.....	\$379.00

LIVING VIDEO TEXT		Software	
Think Tank.....	\$109.00	Word Perfect 4.1.....	\$219.00
Ready.....	\$64.99		

Lotus		SUBLOGIC	
Symphony.....	\$429.00	Jet.....	\$39.99
1-2-3 2.0.....	CALL		

MECA		synapse	
Managing Your Money 2.0.....	\$109.00	File Manager (IBM).....	\$39.99

IBM MicroPro		TLC ACCOUNTING	
Easy.....	\$119.00	Solomon III GL, P, AH, AP.....	\$519.00
WordStar 2000.....	\$249.00		
WordStar 2000+.....	\$299.00		
WordStar Professional.....	\$299.00		
WordStar Professional Pack w/GL Demo.....	\$169.00		

THOUGHTWARE		TLC ACCOUNTING	
Trigger.....	\$239.00	Solomon III GL, P, AH, AP.....	\$519.00
Sell, Sell, Sell.....	\$299.00		
Training Application.....	\$179.00		

IBM PC IBM PC-II IBM-XT IBM-AT SYSTEMS

Configured to your specifications.

Call for the price and availability of your system requirements.

IBM		CALL	
Selan (7300).....	CALL		
6300.....	CALL		

COMPAG		CALL	
Portables.....	CALL		
Desk Pcs.....	CALL		
AT286.....	CALL		

KAYPRO		CALL	
KP-2000 Portable.....	CALL		

ITT		CALL	
ITT X-TRA.....	CALL		
256K, 2 Drive System.....	CALL		
256K, 10 meg Hard Drive System.....	CALL		
XPS, 20 meg.....	CALL		

SANYO		CALL	
MBC 550-2 Single Drive.....	CALL		
MBC 555-2 Dual Drive.....	CALL		
875 Portable.....	CALL		
880 Desktop.....	CALL		
775 Portable.....	CALL		

SANYO		CALL	
MBC 550-2 Single Drive.....	CALL		
MBC 555-2 Dual Drive.....	CALL		
875 Portable.....	CALL		
880 Desktop.....	CALL		
775 Portable.....	CALL		

SANYO		CALL	
MBC 550-2 Single Drive.....	CALL		
MBC 555-2 Dual Drive.....	CALL		
875 Portable.....	CALL		
880 Desktop.....	CALL		
775 Portable.....	CALL		

SANYO		CALL	
MBC 550-2 Single Drive.....	CALL		
MBC 555-2 Dual Drive.....	CALL		
875 Portable.....	CALL		
880 Desktop.....	CALL		
775 Portable.....	CALL		

SANYO		CALL	
MBC 550-2 Single Drive.....	CALL		
MBC 555-2 Dual Drive.....	CALL		
875 Portable.....	CALL		
880 Desktop.....	CALL		
775 Portable.....	CALL		

SANYO		CALL	
MBC 550-2 Single Drive.....	CALL		
MBC 555-2 Dual Drive.....	CALL		
875 Portable.....	CALL		
880 Desktop.....	CALL		
775 Portable.....	CALL		

SANYO		CALL	
MBC 550-2 Single Drive.....	CALL		
MBC 555-2 Dual Drive.....	CALL		
875 Portable.....	CALL		
880 Desktop.....	CALL		
775 Portable.....	CALL		

SANYO		CALL	
MBC 550-2 Single Drive.....	CALL		
MBC 555-2 Dual Drive.....	CALL		
875 Portable.....	CALL		
880 Desktop.....	CALL		
775 Portable.....	CALL		

SANYO		CALL	
MBC 550-2 Single Drive.....	CALL		
MBC 555-2 Dual Drive.....	CALL		
875 Portable.....	CALL		
880 Desktop.....	CALL		
775 Portable.....	CALL		

SANYO		CALL	
MBC 550-2 Single Drive.....	CALL		
MBC 555-2 Dual Drive.....	CALL		
875 Portable.....	CALL		
880 Desktop.....	CALL		
775 Portable.....	CALL		

SANYO		CALL	
MBC 550-2 Single Drive.....	CALL		
MBC 555-2 Dual Drive.....	CALL		
875 Portable.....	CALL		
880 Desktop.....	CALL		
775 Portable.....	CALL		

SANYO		CALL	
MBC 550-2 Single Drive.....	CALL		
MBC 555-2 Dual Drive.....	CALL		
875 Portable.....	CALL		
880 Desktop.....	CALL		
775 Portable.....	CALL		

SANYO		CALL	
MBC 550-2 Single Drive.....	CALL		
MBC 555-2 Dual Drive.....	CALL		
875 Portable.....	CALL		
880 Desktop.....	CALL		
775 Portable.....	CALL		

SANYO		CALL	
MBC 550-2 Single Drive.....	CALL		
MBC 555-2 Dual Drive.....	CALL		
875 Portable.....	CALL		
880 Desktop.....	CALL		
775 Portable.....	CALL		

SANYO		CALL	
MBC 550-2 Single Drive.....	CALL		
MBC 555-2 Dual Drive.....	CALL		
875 Portable.....	CALL		
880 Desktop.....	CALL		
775 Portable.....	CALL		

SANYO		CALL	
MBC 550-2 Single Drive.....	CALL		
MBC 555-2 Dual Drive.....	CALL		
875 Portable.....	CALL		
880 Desktop.....	CALL		
775 Portable.....	CALL		

SANYO		CALL	
MBC 550-2 Single Drive.....	CALL		
MBC 555-2 Dual Drive.....	CALL		
875 Portable.....	CALL		
880 Desktop.....	CALL		
775 Portable.....	CALL		

SANYO		CALL	
MBC 550-2 Single Drive.....	CALL		
MBC 555-2 Dual Drive.....	CALL		
875 Portable.....	CALL		
880 Desktop.....	CALL		
775 Portable.....	CALL		

SANYO		CALL	
MBC 550-2 Single Drive.....	CALL		
MBC 555-2 Dual Drive.....	CALL		
875 Portable.....	CALL		
880 Desktop.....	CALL		
775 Portable.....	CALL		

SANYO		CALL	
MBC 550-2 Single Drive.....	CALL		
MBC 555-2 Dual Drive.....	CALL		
875 Portable.....	CALL		
880 Desktop.....	CALL		
775 Portable.....	CALL		



SPERRY
Sperry-IT..... At Low As \$1749.00
Sperry-IT..... At Low As \$2699.00
Call for Specific Configuration!

CORONA		CALL	
PPC400 Dual Portable.....	\$1289.00		
PPCKT 10 meg Portable.....	\$1989.00		
PC40022 Dual Desktop.....	\$1389.00		
PC400-HD2 10 meg.....	\$1699.00		

ZEM		CALL	
PC-156-21 Single Desktop.....	CALL		
PC-156-52 Dual Desktop.....	CALL		
PC-156-53 10 meg Desktop.....	CALL		
PC-161-21 Single Portable.....	CALL		
PC-161-52 Dual Portable.....	CALL		
2-200 (AT).....	CALL		
171 (Portable).....	CALL		
138 (Transportable).....	CALL		
148 (Desk Top).....	CALL		

ZEM		CALL	
PC-156-21 Single Desktop.....	CALL		
PC-156-52 Dual Desktop.....	CALL		
PC-156-53 10 meg Desktop.....	CALL		
PC-161-21 Single Portable.....	CALL		
PC-161-52 Dual Portable.....	CALL		
2-200 (AT).....	CALL		
171 (Portable).....	CALL		
138 (Transportable).....	CALL		
148 (Desk Top).....	CALL		

KENSINGTON MICROWARE		CALL	
Master Piece.....	\$99.99		
Master Piece Plus.....	\$119.00		

CURTIS		CALL	
Side Mount 55.....	\$19.99		
Diamond SP-2.....	\$39.99		
Emerald SP-2.....	\$44.99		
Sapphire SPF-1.....	\$59.99		
Ruby SPF-2.....	\$69.99		

IDEA ASSOCIATES		CALL	
\$251 (on line).....	\$589.00		

PARADISE		CALL	
Modular Graphics Card.....	\$279.00		
Multi Display Card.....	\$229.00		
Five Pack C. S.....	\$159.00		
ColorMono.....	\$159.00		

SANYO		CALL	
Color 400 Princeton.....	\$519.00		
Color 400 Texas.....	\$519.00		

INTRODUCING ONE MORE REASON TO DUMP YOUR OLD PRINTER.

You can think of plenty of reasons to dump your old printer.

It's too slow. Too finicky. Too limited. Or it's simply down too often.

Well, here's one more reason.


The new Alps P2000[®] Dot Matrix Printer. It's everything your old printer's not.

It's dependable. If you give it

reasonable care, it'll give you five or more years without a breakdown.

It's fast. It prints drafts at 250 cps. Memos at 125 cps. And near letter quality correspondence at 50 cps. All with perfect clarity.

It's versatile. It prints everything from letters and graphics to 16-inch-wide spreadsheets. And it runs with



ALPS P2000

P2000 is a trademark of Alps Electric Co., Ltd. © 1985 Alps America.

all the most popular PCs and software.

What's more, it comes with all the extras office automation gurus look for. Like a paper-saving push/pull tractor feed. Multiple type fonts and sizes. Bi-directional printing. And more.

We could go on. But you get the point.

The best reason to dump your old

printer is a better printer.

The Alps P2000.

For our brochure and the name of our dealer nearest you, call (800) 828-ALPS. In California, (800) 257-7872.

ALPS
AMERICA

CIRCLE 380 ON READER SERVICE CARD

Tools That Make Your Job Easier

For PC DOS/MSDOS (2.0 and above/128K) • IBM PC/Compatibles, PC Jr., Tandy 1000/1200/2000, & others
For CPM80 2.2/3.0 (Z80 required/64K) • 8" SSD, Kaypro 2/4, Osborne 1SD/DD, Apple II, & others

MIX EDITOR

Programmable, Full/Split
Screen Text Processor

Introductory
Offer

29⁹⁵

Great For All Languages

A general purpose text processor, the MIX Editor is packed with features that make it useful with any language. It has auto indent for structured languages like Pascal or C. It has automatic line numbering for BASIC (255 character lines). It even has fill and justify for English.

Split Screen

You can split the screen horizontally or vertically and edit two files simultaneously.

Custom Key Layouts

Commands are mapped to keys just like WordStar. If you don't like the WordStar layout, it's easy to change it. Any key can be mapped to any command. You can also define a key to generate a string of characters, great for entering keywords.

Macro Commands

The MIX Editor allows a sequence of commands to be executed with a single keystroke. You can define a complete editing operation and perform it at the touch of a key.

Custom Setup Files

Custom keyboard layouts and macro commands can be saved in setup files. You can create a different setup file for each language you use.

MSDOS Features

Execute any DOS command or run another program from inside the editor. You can even enter DOS and then return to the editor by typing exit.

MIX C COMPILER

Full K&R Standard C Language
Unix Compatible Function Library

Introductory
Offer

39⁹⁵

Complete & Standard

MIX C is a complete and standard implementation of C as defined by Kernighan and Ritchie. Coupled with a Unix compatible function library, it greatly enhances your ability to write portable programs.

The Best C Manual

MIX C is complemented by a 400 page manual that includes a tutorial. It explains all the various features of the C language. You may find it more helpful than many of the books written about C.

Fast Development

MIX C includes a fast single pass compiler and an equally fast linker. Both are executed with a simple one line command. Together they make program development a quick and easy process.

Fast Execution

The programs developed with MIX C are fast. For example, the often quoted prime number benchmark executes in a very respectable 17 seconds on a standard IBM PC.

Standard Functions

In addition to the functions described by K&R, MIX C includes the more exotic functions like *setjmp* and *longjmp*. Source code is also included.

Special Functions

MIX C provides access to your machine's specific features through BDOS and BIOS functions. The CHAIN function lets you chain from one program to another. The MSDOS version even has one function that executes any DOS command string while another executes programs and returns.

Language Features

- Data Types: char, short, int, unsigned, long, float, double (MSDOS version performs BCD arithmetic on float and double-no roundoff errors)
- Data Classes: auto, static, extern, register
- Struct, Union, Bit Fields (struct assignment supported)
- Typedef, Initialization
- All operators and macro commands are supported

30 DAY MONEY BACK GUARANTEE

Orders Only: Call Toll Free 1-800-523-9520, (Texas only 1-800-622-4070)

MIX Editor \$29.95 + shipping (\$5 USA/\$10 Foreign) Texas residents add 6% sales tax

MIX C \$39.95 + shipping (\$5 USA/\$25 Foreign) Texas residents add 6% sales tax

Visa _____ MasterCard _____ Card # _____ Exp. Date _____

COD _____ Check _____ Money Order _____ Disk Format _____

Computer _____ Operating System: MSDOS _____ PC DOS _____ CPM80 _____

Name _____

Street _____

City/State/Zip _____

Country _____

Phone _____

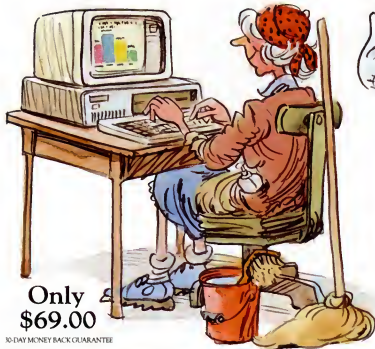
MSDOS is a trademark of Microsoft. PC DOS is a trademark of IBM. CPM80 is a trademark of Digital Research. WordStar is a trademark of Microfit.

MIX
software

2114 E. Arapaho
Suite 303
Richardson, TX 75081

Dealer Inquiries Welcome
Call (214) 783-0001

PreCursor™ Makes The Hard Disk Easy.



Only
\$69.00

30-DAY MONEY BACK GUARANTEE

PreCursor™ is an amazingly compact and sophisticated indexing system for your hard disk. It runs just ahead of your other applications and makes some very user-friendly arrangements. And at a very businesslike price.

Without PreCursor™, it takes a whole manual of commands to find and execute programs from your hard disk. In a business setting, where novice users must access your system, this is aggravating and expensive.

Tailoring PreCursor™ to your system is an easy operation. On-line help is available at the touch of a function key. A triple level of password protection is built right in. You don't need to know paths or subdirectories or other complicated syntax. You can even change the color of PreCursor™.

After PreCursor™ is setup on your hard disk, it greets you each time the machine is turned on with a list of available programs. You can make simple index choices of even the most complex DOS commands. And set up your printer with the speed and ease of an old pro.

If you're a sophisticated user, you'll love the convenience of full interaction with batch files, passable parameters and user prompts. Home users will appreciate the sure ease of operation.

If you depend on your hard disk for businesslike performance, you can rely on PreCursor™ for instant access.

Thanks to PreCursor™, The Hard Disk isn't so hard anymore.

CIRCLE 196 ON READER SERVICE CARD

Dealer Inquiries Welcome

PreCursor™ will run on IBM compatible MS-DOS systems.

IBM is a registered trademark of International Business Machines Corporation.

Make My Hard Disk Easy!

- ☐ Here's my order for _____ copies.
☐ Find my check for \$69.00 each enclosed (plus \$5.00 for postage and handling).
☐ Please charge this purchase to my ☐ Visa ☐ MasterCard *

Card # _____ Exp. Date _____

Name _____

Title _____

Company Name _____

Address _____

City _____ State _____ Zip _____

Texas residents add 5.125% sales tax. (Non-tax residents - 6.125%.)

Outside U.S. please add \$15. Checks must be on a U.S. bank

and in U.S. dollars. Sorry, no C.O.D.'s or purchase orders.

Send to: PreCursor™

The David L. Aldridge Company, Inc.

940 Town & Country Village, Houston, Texas 77024

To place credit card orders by telephone, call 713-964-7465 or

toll free, call 800-518-8557 x822. in Calif., call 800-622-3470 x822

PreCursor

Save

1-800-231-9842
WESTERN REGIONAL ORDERS



- Low Low Prices
- No Surcharge for MasterCard and VISA

1-800-237-4048
EASTERN REGIONAL ORDERS

These Fine Corporations, Universities and Companies Put Their Trust In "COMPUTER MART"

ATT
3M
Magnavox
Eaton
Merrill Lynch

American Savings
Landmark Mortgage
American Nurse Assoc.
Dun & Bradstreet
U.S. Navy - Army

University of:
California
Illinois
New York
Colorado State

Put Your Trust In **COMPUTER MART**

• COMPUTERS •

IBM ENHANCED AT	4928
IBM ENTRY LEVEL AT	3241
IBM PC, 1 DSDD DR, 256K	1702
IBM PC, 2 DSDD DR, 256K	1826
IBM PC, NO DRIVES, 64K	1616
IBM PC, 2 HALF/HYTE	
256K	1702
IBM XT, 1DSDD DR/10MB,	
256K	3355
IBM XT, 1DSDD DR/TA HD,	
256K	2491
COMPAQ, 2 DSDD, 256K	2173
COMPAQ PORTABLE 2	
MODEL 2	5292
COMPAQ DESK PRO	
MODEL 3	3304
COMPAQ DESKPRO	
MODEL 2	2156

• MONITORS •

AMDEK 300G	119
AMDEK 300A	123
AMDEK 310A	140
AMDEK 600 RGB COLOR	409
AMDEK 710 SUPER HI RES	
COLOR	447
IBM COLOR	616
IBM MONOCHROME	235
PRINCETON MAX-12 E	160
PRINCETON HX-12 RG	
COLOR	446
PRINCETON SR-12	575
PRINCETON HX-12E	
COLOR	510
QUADRAM AMBER-	
CHROME	171
QUADRAM QUADCHROME	
II	426

• DISPLAY CARDS •

STB SUPER HI RES 400	402
HERCULES COLOR	151
IBM MONOCHROME	218
IBM COLOR	226
EVEREX GRAPHICS EDGE	328
GENOA SPECTRUM	289
TECMAR GRAPHICS	
MASTER	459
PARADISE MODULAR	
GRAPHICS	274

• BOARDS •

AST SIX PACK PLUS, 64K	223
AST MEGAPLUS, 64K	205
AST MP2, 64K	228
AST ADVANTAGE, 128K	384
AST I/O PLUS	122
JRAM-2	156
QUADRAM QUADBOARD	
OK	186
QUADSPRINT	423
TECMAR CAPTAIN, OK	162
TECMAR FIRST MATE, OK	200
TECMAR WAVE XT, 64K	187
TECMAR JR CAPTAIN,	
128K	295

• MODEMS •

HAYES 2400	627
HAYES 3000	138
HAYES 300/1200	407
HAYES 1200B	
w/SOFTWARE	346
HAYES 1200B	351
VEN-TEL HALF CARD	374
VEN-TEL 300/1200	
INTERNAL	341

AST REACH HALF CARD	
1200	363

• PRINTERS •

OKIDATA 83A, WIDE	
CARRIAGE	545
OKIDATA 84P, WIDE	
CARRIAGE	660
OKIDATA 92P	392
OKIDATA 93P, WIDE	
CARRIAGE	597
OKIDATA 2410P	1782
OKIDATA 182	215
OKIDATA 192	376
OKIDATA 182S	259
OKIDATA 184	660
EPSON FX-80 TRACTOR	371
EPSON LX-80	255
EPSON FX-185, WIDE	
CARRIAGE	515
EPSON FX-100, WIDE	
CARRIAGE	531
EPSON JX-80 COLOR	
PRINTER	531
EPSON LQ-1500	
PARALLEL	1002
NEC 2050	694
NEC 3550	1058
NEC 8850	1478
JUKI 6100	362
JUKI 6300	503

• ACCESSORIES •

OKIDATA 82/92 TRACTOR	44
NEC BI-DIRECTIONAL	
TRACTOR	151
NEC CUT SHEET GUIDE	63
JUKI 6100 BI-DIRECTION	
TRACTOR	105
JUKI 6300 BI-DIRECTION	
TRACTOR	122
MEMORY, 65K CHIPS	8
MEMORY, 256K CHIPS	39
PRINTER CABLE	10
MICROFAZER BUFFER, 8K	131

Save



COMPUTER MART

1901 S. TAMiami TRAIL, VENICE, FL 33595
2820 W. CHARLESTON, LAS VEGAS, NV 89102

Call for non-advertised and lower current prices. IBM is a registered trademark of International Business Machines. Prices subject to change. We accept all major credit cards, money orders, and personal checks. 2% surcharge for shipping, handling and COD shipments, and purchase orders \$100 minimum. Returns are subject to a 10% restocking fee. All sales final.
IN FLORIDA CALL 813-493-2736
IN NEVADA CALL 702-877-3888

Tracking Down Lost Data

If the erased file's directory entry and the pointer into the file's FAT are still there, you have a good chance of recovering lost data. Part 2 of this continuing series describes three methods for finding it.

In my last column, I began a series on what can go wrong with a disk, some of the reasons why it happens, and what you can do to repair the damage to your valuable files.

It's all too easy to erase a file you didn't mean to erase—especially if you want to erase one file, but unintentionally slip in an asterisk (*) that erases a whole series of files. When that happens, how do you get that data back?

If you don't have a good backup copy of the data, you'll have to rely on magic tricks to get back your erased files. In the last issue I discussed why it is possible to even consider undoing an erasure: The reason is that erasing a file in DOS doesn't actually wipe out the data it contains. When DOS erases a file, it obliterates the disk's master record of what parts of the disk that file occupied. That is, DOS wipes out what's called the file's space allocation chain in the disk's File Allocation Table (FAT).

Each part of the disk that stores data has a corresponding entry in the disk's FAT. If that part of the disk is being used to hold a particular file's data, it's marked as part of a sequential chain that links the data together in order; if not, it's marked as available for future use.

Although DOS wipes out this chain when you erase a file, making you lose track of the sequence where the data was stored, you don't lose the starting point in the chain.

Chain Links

The reason is simple: the starting point, which defines the location where each file's data begins, isn't stored in the disk's

FAT, but in the file's directory entry. You see, each file on your disk has three parts: the directory entry that describes the file (with its name and so forth); the file's actual stored data; and, finally, the FAT that connects the directory entry to the data by describing in a sequential chain where the



Peter Norton

data is stored. The reason why the file's directory entry records the chain's starting point, which describes where the file's data begins, should be obvious after a moment's thought.

DOS begins tracking down your files by looking up the name of the file in the disk's directory. The file's directory entry points it into the disk's FAT, or more specifically, to the first link in a sequential chain of entries in the FAT that describe, piecemeal, where the data is stored. Thus, even though DOS wipes out the linked chain when you erase a file, it doesn't touch the pointer to the first link in the chain.

A User's Prayer

When you set out to recover an erased file, pray for two things: First, that the erased file's now-abandoned directory entry is still there, complete with its starting pointer. Second, that when you trace that pointer into the disk's FAT, you'll find it marked "available" for use and not taken by another file.

Both of those hoped-for items are sure to be there if you're trying to recover your file immediately after you erased it. But if any other file data has been written onto a disk since you erased the file, you're in danger of losing either or both of them. If you create any new files, they may take over and reuse the erased file's old directory entry; and if you write any file data on the disk (for a new file or an old one), it may reuse the space where your erased file's data was stored.

You'll know whether it's good news or bad news as soon as you start trying to recover the file. If you can find the erased file's directory entry, you're halfway there. And if that directory entry points to an area in the disk's FAT that isn't being used by any other file, then you're the other half of the way there, and the good news is complete.

Of course, if either one of these steps goes wrong, you're in trouble. But as long as both look good, your prospects are bright. However, even if both steps are all right, you still have to track down all the data (not just the first part, which you get for free) and verify that it's the right data.

Data Search

There are two basic ways to find the right data for your file. One simply is to

The \$75 Custom Forms Factory.

FormTool™

Software to create, edit and customize any type of forms.

BLOC DEVELOPMENT
DO NOT READ
ON 1-800-1

BLOC
development corporation

With new FormTool™ all your business forms can be business-like. FormTool is the first and only forms editor that gives you everything you need. No more ruler and pen; you'll draw lines at the press of a button.

Grids, text, spacing—everything. Made simple. Forget your word processor's limitations. FormTool gives you intelligent line drawing, powerful editing, boldfacing, justification, block operations, variable form sizes, and much more.

Old forms. New forms. Simplify and standardize all your old forms in

no time. Probably improve most of them, too. What's more, the needed forms you've just never taken the time to create are practically done before you start.

When you need a new form, you can instantly produce a prototype. Then test it before you spend money on printing.

FormTool stores all your forms as standard ASCII files. So you'll never lose an "original" again.

User interface that won't limit—or intimidate—anybody.

Experts and beginners all agree. FormTool is so adaptable, it will help

you design any form. From time sheets, expense reports, right down to the most customized form your business needs.

Watch new ideas take form. With FormTool, you'll find all kinds of better ways to manage, collect data and streamline your information flow. It means better forms. Simpler forms. Perhaps even fewer forms.

To order, contact your local dealer or call toll free 1-800-231-1149 (In Florida, 1-800-624-2063). (Visa and MasterCard accepted). Or send us a check; Florida residents add 5% sales tax.

REQUIREMENTS: IBM PC/XT/AT or 100% compatible. 256K Ram, IBM compatible Dot Matrix Printer, Hewlett Packard Laser Printer.

CIRCLE 515 ON READER SERVICE CARD

BLOC

development corporation

1301 Dade Blvd., Miami Beach, FL 33139

THE NORTON CHRONICLES

grab the most likely stuff; the other is to hunt it down, based on what you know is in the file.

Grabbing the most likely stuff is a mechanical process based on a simple strate-

gy for finding where the data is most likely to be located on the disk. You know, from looking at the directory entry, where the first part of the data is stored on the disk. Common sense tells you that the rest of the

file should be recorded on those portions of the disk that follow just after the beginning. So "grabbing the most likely stuff" simply means taking data from the first available space after the beginning of the file.

This method of tracking down the data is based on the same working principle that DOS used when it recorded your data in the first place. Obviously, if you try to find your erased data by using the same rules that DOS used to store it in the first place, then you should be home free.

You'll know whether there's good news or bad news as soon as you start trying to recover your file. If you can find the erased file's directory entry, you're halfway there.

The method just described is the "blind" approach to finding an erased file's data, and it's used by some of my own programs as well as by those of my competitors. In my program set, both the new QU (Quick-UnErase) program and the NU program use the blind approach.

Life would be perfect if the blind approach were all you needed to track down your data, but things are rarely that simple: Data is all too often stored in a convoluted way that defeats the blind method of data recovery.

Scattered Data

If you start out with a fresh blank disk and record your data on it, each file will be laid out in a clean fashion, recorded in one contiguous chunk. But as you use a disk, adding and deleting and updating files, the space allocation becomes more and more complex. The larger the disk and the more actively you use it, the more scattered the data storage becomes, and the more complicated the process of tracking down the data that belongs to an erased file.

To give you an example of just how complex the storage system can become, one of the files on my hard disk is scattered



Increase the speed of your computer by as much as 4-8 times. Why buy a PC AT when all you may need is some **FLASH**. **FLASH** is just that, it gives disk accesses in a **FLASH**. Every PC owner can't be without **FLASH** once the powers of **FLASH** are discovered. The program is totally invisible to the user. There is nothing to learn. Make your floppies faster than a hard disk. Make your hard disks faster than ever before. Allows the user to have sub-directories on his floppies without the usual loss of speed. **FLASH** will also tell you just how much faster you are running than you would have been without **FLASH**. **FLASH** is handcrafted in ASSEMBLER. Upgrade your computer with **FLASH**. Batch files will fly like they had wings. Save wear & tear on expensive program disks.

You'll be so amazed with your improved performance, you will want to call us to tell us so!

*** FREE HOLIDAY GIFT ***

When you buy **FLASH**, you get **FREE**, one of the **UTILITY ROOM** programs marked with a ★

BENCHMARKS for different programs utilizing **FLASH**

	W/O FLASH	W/FLASH
WORD STAR	2.0	0.33
BASICA	2.7	0.40
LINKING	113.8	6.00
SORTING FILES	105.0	27.00

When **FLASH** increases your speed it generally makes you run 3-5 times faster. In favorable conditions like the ones above **FLASH** can make your PC run 6-16 times faster! PC's over the world are screaming for **FLASH**. Reach the speed of a RAM DISK, without their disadvantages. If you think you DON'T need **FLASH**, call us and tell us why!

Order Line 1-800-25-FLASH
Info Line 1-317-253-8088
MC, Visa, Check, C.O.D.
For: IBM PC, AT, XT, JR, or clone.



Reg. Price
Limited Time

\$89.95
\$49.95

add 4.00 shipping incl
Software Masters
6223 Carrollton Ave.
Indpls., IN 46220

THE UTILITY ROOM

- ★ **Spoof-Master**, ram printer spoofer. Multiple copies, handles single sheets, any buffer size. 49.95 19.95
 - ★ **Buffer-Master**, keyboard buffer extender from 15 to 2000 key type ahead. 29.95 14.95
 - ★ **Super-Ram-Disk**, set up MULTIPLE ram disks and as MANY as you want. 49.95 14.95
 - ★ **Cabo-Pad**, ram resident calculator, hex octal binary and decimal. Works in ANY graphic mode. Unlimited parenthesis nesting. Many functions. 49.95 24.95
 - ★ **Sort-Merge-Copy**, a super sort utility. Use it stand alone or call it from ANY language. 199.00 49.95
 - ★ **Unprotected**, unprotects basic programs. 49.95 19.95
 - ★ **Data-Path**, Have paths setup to find your data and overlay files. Works with ALL programs. 49.95 19.95
 - ★ **MoveHard**, gain up to 10%-50% more hard disk space! 49.95 19.95
- All programs work in harmony with each other.

SUPER—ED Version 3.0

- Do ANY DOS command or RUN ANY program from within **SUPER-ED**.
- Turbo Pascal like environment for ANY language.
- MULTI-FILE window editing. Move & copy between file windows.
- Extensive Find & Replace usage.
- ON-LINE editing HELP.
- Editing commands & colors & more are fully user configurable.
- ON-LINE language-specific user definable HELP.
- Full featured editor with **WORD STAR** like commands.
- Fully utilizes sub-directories.
- Supports keyboard MACROS.

Reg. Price
Limited Time

\$59.95
\$29.95

We believe in the highest quality software at the lowest possible price!
Turbo Pascal is a trademark of Borland Int. Word Star is a trademark of Micro Pro Int.

CIRCLE 487 ON READER SERVICE CARD

across 47 distinct areas. If you want to explore how scattered your own disk storage might be, you can use the DOS command CHKDSK to get a list of the files with non-contiguous storage; or you can use the mapping feature of the NU program in my program set to draw a picture of how your files are scattered.

Since the blind method won't recover a scattered file, you must become actively involved in the recovery process and know something about the data you're looking for: Either you have to tell the program

cerpts from your data. Once the program has found a section of data, you have to tell it what might come next—again and again until all the data is found.

Those are essentially the three methods

that all file recovery programs follow. In my next column, I'll talk about some of the tricks that you can use to improve your chances of successfully getting your data back.

There are two basic ways to find your file's lost data. One simply is to grab the most likely stuff; the other is to hunt it down, based on what you know is in the file.

what some of the data is (so that the program can search for it), or you must recognize it when you see it.

Guessing Game

A good recovery program should be able to work in three ways. The first is the blind method I've just described. The second is half blind, or blind with guidance. Using this method, the program makes a series of intelligently blind guesses as to the location of your data, then presents the data to you for inspection. If you recognize it, you take it and add it to the collection of data that you are accumulating as you recover your lost file. If the data that's found doesn't look like what you've lost, pass over it and continue looking for some more.

The third approach isn't blind at all. To use it, you have to have some notes on what your data consisted of before you start to search for it. Here, you successively tell the program what sort of data you expect will come next in the erased file, and the program looks for it. While this approach may seem like the best of all, it has one major drawback: you must be able to present the program with a series of ex-

Create screens like this in minutes...



and Screen Sculptor writes the program!

In Basic and Turbo Pascal

It's that easy! The same Screen Sculptor package generates programs in IBM Basic, Turbo Pascal, and IBM Pascal.

Now, anyone can have attractive, intelligent input screens and sophisticated data entry routines in minutes.

Move pieces of the screen around, select colors from a menu, draw lines and boxes, paint, repeat last character in any direction.

And more!—Specify variable names, data types, acceptable data ranges, pictures for edit checking, etc.

Screen Sculptor then generates actual program source code based on your screen design. Use it as is or modify it.

And it's only \$125

Requires an IBM PC, XT, PCjr, PC AT or 100% compatible, 128K, DOS, one 320K disk drive and any 80 column display.



"GREAT PRODUCT! GREAT VALUE!"

C. Schmidt, PC Buyer Guide

Here's a special offer. Order now and you'll also get a full demo disk. Use the disk to test the program for 30 days. If you don't love it, return the package for a full refund.

All other orders and inquiries or write, Software Bottling Co., 6600 L.I. Express, Maspeth, NY 11378.

718-458-3700.

NO RISK DEMO OFFER!

Credit card orders call operator 268

(800) 824-7888



THE SOFTWARE BOTTLING COMPANY OF NEW YORK



COMPARE...

MULTIFUNCTION BOARD FOR AT	M.A. SYSTEMS OPTIMIZER	AST ADVANTAGE	TECMAR MAESTRO
5 MB MEMORY ON ONE SLOT	YES	NO	NO
2 SERIAL 1 PARALLEL	YES	YES	NO
PRODUCTIVITY SOFTWARE WITH DIAGNOSTICS	YES	NO	NO
SLOTS NEEDED FOR MAX AT MEMORY	3	5	4
DOS & XENIX DRIVERS FOR COM 1 THRU COM 8	YES	NO	NO
DOS & XENIX DRIVERS FOR LPT 1 THRU LPT 8	YES	NO	NO

...THEN OPTIMIZE

Yes, it's true! Our PC-AT OPTIMIZER does more than any other board available to squeeze maximum performance from PC-AT's or AT clones.

You can begin with the OPTIMIZER main board, which, incorporating the control logic process functions, can be populated with up to 2.5 megabytes of RAM memory. A simple plug-in to the main board adds another 2.5 megabytes of RAM. Another plug-in adds one parallel and two serial ports.

Hungry for more memory? With another OPTIMIZER board you can boost memory incrementally up to 10 megabytes. A third board can take you all the way to a whopping 15 megabytes — using only three expansion slots.

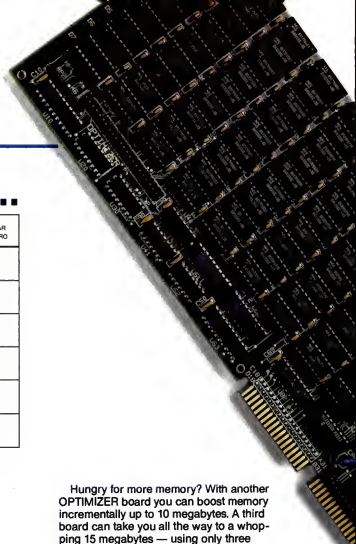
That kind of capacity means your PC-AT is more than ready for applications such as Lotus 1-2-3 and Framework type spreadsheets. Ready to work with DOS 3.0/3.1 as well as XENIX or UNIX. And to handle high-speed multitasking multi-user applications.

Finally, the AT OPTIMIZER matches distinctive power with distinctive reliability — because it's made by M.A. Systems, the people with the most complete line of PC add-ons — and the most dependable.

CIRCLE 481 ON READER SERVICE CARD

US
(800) 543-6546
CA
(800) 223-3276

2015 O'Toole Ave.
San Jose, CA 95131
(408) 943-0596
Telex 346485



THE MOST POWERFUL, MOST
COMPLETE dBASE PROGRAM
DEVELOPMENT TOOL EVER!

FLASH CODE™

INTRODUCTORY
PRICE
\$150.

Program Developer
for **dBASE II & dBASE III**

Actually "DRAW" your dBASE screens!

Take full advantage of all special characters, draw boxes and lines, use the color select menu, move pieces of the screen around, and more! Specify variable names, file variables, data types, acceptable data ranges, pictures for edit checking, initial values, calculated fields, indexes, and more in a flash!

FLASH Code writes your program in either dBASE II or dBASE III!

Use it as is, modify it, or merge it with your own code. You can even use our new FLASHUP module to instantly flash up even the most complicated screen designs. No more waiting for slow print statements to display your screens.



POP-UP Windows

Create pop-up menus and pop-up help screens with our window editor. Use the FLASHUP module and have them pop up all over your dBASE applications.

NO RISK DEMO OFFER! TRY IT—YOU'LL USE IT!

Here's a no-risk offer. Order now and you'll also get a full demo disk. Use the demo and the manual for 30 days. If you don't love it, return the package for a full refund!



THE
SOFTWARE
BOTTLING
COMPANY
OF NEW YORK

Credit card orders only call 24 hours a day, 1-800-824-7888, operator 268.
For all other orders and inquiries call or write: The Software Bottling Company of New York, 6600 L.I. Expwy, Maspeth, NY 11378,
(718) 458-3700. If we're shipping to a NYS address, please add 8 1/2% sales tax.

CIRCLE 530 ON READER SERVICE CARD

Filling your needs m

Today's PC buyer is no pushover. Not only are low prices and prompt delivery demanded, but professional support, sound advice and innovative servicing of accounts is expected. It's no coincidence then that PC buyers all across the nation call PROGRESSIVE MICRO DISTRIBUTORS first. Here's why.

LOW COST, HIGH TECH SOLUTIONS.

PROGRESSIVE MICRO DISTRIBUTORS has the best prices on popular IBM PC hardware and software in the country (call and compare). Most orders are shipped the same or next day from our 25,000 sq. ft. warehouse. Although we ship literally hundreds of orders daily, all PC's are burned in overnight to insure that your system arrives in excellent condition.

We believe it takes a professional to provide professional service. That's why all sales and service staff members, from our factory authorized technical experts to our highly experienced account representatives, are rigorously trained on all current and new hardware and software. And if the need ever arises, direct access to our on-line customer service and technical support centers is available and convenient to use.

HOW TO KEEP UP WITH PROGRESSIVE.

As a PROGRESSIVE MICRO DISTRIBUTORS' customer, you'll also be privy to new product information and special money saving incentives through the Microgram™ our monthly customer newsservice. You'll also receive monthly price lists showing current pricing on our complete line of hardware, software and services. Lists are shipped automatically with all system orders and are available on disk when requested. Plus, **FREE** UPS shipping is guaranteed on all prepaid orders with confirmation of current pricing.

Call PROGRESSIVE MICRO DISTRIBUTORS today, **TOLL FREE** at **1-800-446-7996**, and we'll mail a current price list to you immediately. And remember, only PROGRESSIVE MICRO DISTRIBUTORS gives you all of these benefits: low prices, sound advice, prompt delivery, professional support and direct customer service.



POLICIES

1. We accept VISA, MC, AMEX; No surcharge for VISA or MC.
2. COD requires cash or certified check; Company check when approved.
3. Allow 1 week for personal and company checks to clear.
4. Wiring information available upon request.
5. Corporate, Government and Institutional volume purchase agreements available.
6. Call for exact shipping charges; air shipments take priority.
7. If we must split shipment, you incur no additional shipping charges.
8. All orders shipped insured — No additional charge.
9. All products fully warranted; Some up to 5 years.
10. All items subject to availability; Prices subject to change without notice.

FOR ORDERS

1-800-446-7996

CUSTOMER SERVICE

1-404-446-7996

ORDERING INFORMATION

1-404-446-7995

TECH ASSISTANCE

1-404-446-7997

HRS: 9AM-9PM EST. SAT. 12N-5PM EST.

©1988 AT&T Information Systems.
IBM is a registered trademark of the International Business Machines Corp.

CompuAdd

"Personal Computer Products"

HARD DISK HEADQUARTERS



Hard Disk Kits for the **IBM PC™**

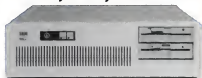
One Year Warranty!

Convert your PC to an XT with our hard disk kits. Complete with hard disk controller, cables, manuals, mounting hardware and easy-to-use software.

- 10 MB Hard Disk Kits **\$395**
- 20 MB Hard Disk Kit **\$479**
- 30 MB Hard Disk Kit **\$695**

IBM®

PC, XT, & AT™



Call For Prices \$\$\$

COMPAQ® portable \$Call

Hard Disk Kits for the **IBM AT**



High Performance, Fast Access Winchester Hard Disks

- 38 msec Average Access Time
- Fully PC-AT Compatible
- Boots Directly From Hard Disk
- Includes Cables, Manual & Mounting Rails

\$595

20 Mbyte
formatted capacity

\$749

30 Mbyte
formatted capacity



Hard Disk Kits for the

COMPAQ® Portable

- 3½" Shock Mounted Winchester Hard Disk
- Hard Disk Controller
- Cables
- Manual
- Software



\$469

10 Mbyte

\$579

20 Mbyte



Teac 55B



\$95

135 Watt Power Supply



\$85



Hard Disk Chassis
\$149

Memory



9 Chips Per Set
1 Year Warranty!

64K..... **\$8**
(2 sets Min. Order)

256K..... **\$29**

Intel

Math Co-Processor



8087 .. **\$119**

80287 .. **\$219**

Corporate & Institutional Accounts Welcome...

STANDARD BRAND PRODUCTS

All Standard Products Have A 2 Year Warranty!

Standard MFC Multifunction Card w/384K



- Parallel Port
- Memory Expansion
- Calendar
- Clock
- Serial Port

\$129

Standard 5151 Keyboard



- Quiet, Soft Touch,
5151 Style Keyboard
Compatible With IBM PC & XT

\$129

Standard AT-MFC IBM AT Memory Expansion Board



- 128K • Serial Port • Parallel Port

\$299 w/128K

360K Floppy Drive



for the IBM AT™
\$109

Printers

EPSON®

LX 80.....	\$229
FX 85.....	\$379
FX 185.....	\$499
LQ 1500.....	\$929

Okidata

OKI 192.....	\$365
OKI 193.....	\$569

MINUTEMAN™

Total Power Protection!

- Blackouts
- Surges
- Interruptions
- Spikes
- Brownouts
- EMI/RFI

Minuteman 250 250 watts output power capability.....	\$399
--	-------

Minuteman 500 500 watts output power capability.....	\$549
--	-------

AST SixPakPlus w/384K



- SideKick software, memory,
serial port, parallel port,
clock/calendar, electronic
disk & print buffer software

\$235

AST Advantage!



- Multifunction memory
expansion board for
IBM PC-AT w/128K

\$399

AST Preview

- Hercules compatible
monochrome graphics
card with parallel port.

\$279

Hercules

Monochrome Graphics Card.....	\$309
Color Graphics Card.....	\$165



300.....	\$159
1200B.....	\$349
1200.....	\$389
2400.....	\$699

Monitors

Princeton Graphic Systems

HX 12.....	\$459
Color Monitor.....	\$459
Amdek 310A Monochrome Display.....	\$175
Amdek 300A Amber Composite Display..	\$159

Quadram Amberchrome

Amber Monochrome Display.....	\$175
----------------------------------	-------

Our Policy: All prices include fully insured, UPS ground shipping, on all orders shipped in continental U.S.A. No surcharge for VISA, MasterCard or UPS COD payments (Minimum purchase of \$50 on COD & net term orders). We accept fortune 1000 & institutional purchase orders on a net terms basis (with credit approval at no additional charge). Allow 7 days for personal check and company checks to clear.

Add 6 1/8% sales tax if a Texas resident. Prices are subject to change. All equipment carries a new factory warranty. All returned items must be accompanied by a return authorization number and subject to a restocking fee.

RETAIL OUTLET
204 S. 8th
Austin, TX 78701
512-476-7174

RETAIL OUTLET
204 S. 8th
Austin, TX 78701
512-476-7174

RETAIL OUTLET
12024 Research Blvd
Austin, TX 78758
512-250-8594

RETAIL OUTLET
5720 Burnside Rd Suite 14
San Antonio, TX 78238
512-484-8010

RETAIL OUTLET
437 6th Street
San Antonio, TX 78216
512-525-1183

Corporate & Institutional Accounts Welcome: Our national accounts division is dedicated to providing the prompt professional service required to keep your business running smoothly. We accept P.O.'s on a net terms basis, (minimum order \$50 please) offer next day shipping, free fully insured UPS ground shipment. We offer a full-time technical staff to answer any questions that might arise to make fast repairs if needed. You'll notice the difference.

For product information, price quotes
technical support and orders call:

CompuAdd

12303-G Technology
Austin, TX 78727

(800)531-5475 (outside Texas) (512)250-1489 (within Texas)



CIRCLE 228 ON READER SERVICE CARD



On the Threshold Of Supercheap RAM

The price of RAM chips is falling rapidly—and so are the technical barriers to using them. By 1988, 8-megabyte machines will be as popular as 640K systems are now.

Memory for computers isn't free yet, but it's getting there by leaps and bounds. You can already buy a 2-megabyte memory board for the PC for less than \$500 (mail order). And memory prices are expected to continue dropping by 20 to 30 percent a year. The real question, then, is, what are we going to do with all that memory?

At today's low prices, it's already practical to think about stuffing several megabytes of memory into a personal computer. The technical barriers to using lots of memory are also falling: the Lotus/Intel/Microsoft expanded memory specification (EMS) overcomes the 8088 and 8086 chips' 1-megabyte maximum, letting you have another 8 megabytes in your PC. Major applications such as *Framework*, *1-2-3*, and *Symphony* have already been updated to take advantage of EMS, and Microsoft is working on a new version of DOS that will support more memory. Newer computers that use the Intel 80286 can directly address 16 megabytes of memory, and in a couple of years computers with the 32-bit 80386 processor will be able to use up to a whopping 4 gigabytes of memory.

Until recently only large mainframes and superminicomputers had megabytes of memory. According to Computer Intelligence Corporation, a market research firm in La Jolla, California, in 1985 the average DEC VAX 11/780 supermini had 4 megabytes of memory. A small IBM 4381 mainframe had an average of 8 megabytes, IBM's more powerful 3083 mainframe had 16 megabytes, and the high-end 3084-Q model usually had 64 megabytes of memory.

To compare today's low personal computer memory prices to those of mainframes, I called a friend who runs a university computer center. His records show that in the 1980-1981 academic year, a megabyte of mainframe memory cost \$53,000. In 1982-1983 a megabyte's cost



Ron Jeffries

dropped to \$31,800, and in 1985 it cost \$7,500 from IBM.

Where will it all end? No one really knows, but market research firms such as Dataquest in San Jose, California, and Future Computing in Dallas, Texas, take all the available data and build models to project future trends. But before discussing their numbers, I'd like to briefly go over some definitions. PCs and most other computers use dynamic random access memory, also called DRAM or just RAM. The figures I'm going to quote don't apply to other types of memory, like the more expensive static RAM or read-only memory (ROM).

Memory production is reported in billions of bits (not bytes) per year, while memory cost is given in millicents (a thousandth of a penny) per bit. These units make it possible to compare the cost of memory in chips with different capacities, such as the 64K and 256K chips common today.

Millicent Megabytes

What will RAM memory cost in the future? According to Susan Scibetta, an analyst at Dataquest Inc. who tracks memory trends, the average cost per bit for dynamic RAM this year has been 1.5 millicents. She says the average cost per bit will drop to 1.2 millicents next year and will go down to 0.8 in 1988. By 1990 RAM will cost a mere 0.4 millicents per bit.

At that rate, by the end of the decade you'll be able to buy 3.75 megabytes of RAM for what 1 megabyte costs today. And prices could go even lower. The president of a company that makes an aggressively priced memory board for the PC tells me he's already buying 256K RAM chips for about \$1.50 each, and he expects the price to drop as low as \$1 per chip before long. A price of \$1.50 for a 256K RAM works out to about 0.6 millicents per bit, well below the 1985 average price reported by Dataquest.

Manufacturing Madness

The total amount of dynamic RAM that will be cranked out each year is staggering. Dataquest estimates that 1985 memory production has been 99,423 billion bits. (If it helps, that's 99.4 trillion bits.) Next year 177,275 billion bits of dynamic RAM will be manufactured. In 1988 some 718,976

How Borland's Three New Holiday Packs Will Fill Your Stocking Without Emptying Your Piggybank.

Three special packs with dazzling discounts that will help get you into a Holiday mood. You can get some of Turbo, most of Turbo, or all of Turbo—including the two newest members of the Turbo family, Turbo GameWorks™ and Turbo Editor Toolbox™. You also get our unmatched 60-day money-back guarantee, quality products that aren't copy-protected.

TURBO NEW PACK \$95.00.

You get the two exciting new members of the Turbo Pascal family.

- **TURBO GAMEWORKS**, Chess, Bridge, and Go-Moku, complete with source code and a 200-page manual.
- **TURBO EDITOR TOOLBOX**, all the building blocks to make your own editors and word processors, complete with source code and a 200-page manual.

TURBO HOLIDAY PACK \$125.00.

You get all three of the Turbo family classics for only \$125.00 (about a 30% discount). Turbo Pascal 3.0 and Turbo Tutor and Turbo Database Toolbox—all for just \$125.00.

- **TURBO PASCAL** combines the fastest Pascal compiler with an integrated development environment.
- **TURBO TUTOR** teaches you step-by-step how to use Turbo Pascal with commented source code for all program examples on diskette.
- **TURBO DATABASE TOOLBOX** offers three problem-solving modules for your Turbo Pascal programs: Turbo Access, Turbo Sort, and GENST, which generates a ready-to-run installation program that lets you forget about adapting your software to specific terminals.

TURBO HOLIDAY JUMBO PACK \$245.00.

This is it—the whole thing, the entire Turbo family including its two newest members. You get:

- Turbo Pascal
- Turbo Graphics Toolbox
- Turbo Tutor
- Turbo Database Toolbox
- Turbo GameWorks
- Turbo Editor Toolbox

and you pay only \$245.00 for all six! Which means that you're getting everything at only about \$40 a piece. Quite a holiday deal. (And if you already own one or several members of the Turbo family, be creative—nothing can stop you from buying the Jumbo Pack, picking out the ones you already have and giving the rest as holiday gifts to family and friends. At these prices you can afford to give to others and to yourself.) Speaking of holidays, this offer lasts until March 31, 1986. (At Borland, we like to make the Holidays last.)

CIRCLE 150 ON READER SERVICE CARD

BORLAND INTERNATIONAL

4585 Scotts Valley Drive, Scotts Valley CA 95066
Phone (408) 438-8400 Telex 172573

Copyright 1985 Borland International BI-1017

Turbo Pascal and Turbo Tutor are registered trademarks and Turbo Database Toolbox, Turbo Graphics Toolbox, Turbo Editor Toolbox, Turbo GameWorks, and MicroLink are trademarks of Borland International, Inc. Borland is a trademark of MicroLink International Corp. MultiMate is a trademark of Multi-Mate International Corp. MicroLink is a registered trademark and Word is a trademark of Microsoft Corp. WordPerfect is a trademark of Software Systems International.



NEW! TURBO GAMEWORKS \$69.95.

Our new Turbo GameWorks offers games you can play and replay without Turbo Pascal or revise and rewrite with Turbo Pascal 3.0. We give you the source code, the manual, the diskettes and the competitive edge. Chess, Bridge and Go-Moku.

State-of-the-art games that let you be player, referee, and rules customize all at once because you have the Turbo Pascal source code. Learn exactly how the games are made—so you can go off and make your own. And Turbo GameWorks is the only quality game you can buy that is not copy-protected. Sold separately, only \$69.95. (Just \$47.50 if you buy the Turbo New Pack.)

NEW! TURBO EDITOR TOOLBOX \$69.95.

Build your own word processor—for only \$69.95!

You get ready-to-compile source code, a full-featured word processor that looks and acts like WordStar™, and a 200-page manual that tells you how to integrate the editor procedures and functions into your programs. With Turbo Editor Toolbox you can have the best of all word processors. You can make WordStar behave like MultiMate. Support windows just like Microsoft's Word. And do it as fast as WordPerfect does it. Incorporate your new "hybrids" into your programs to achieve incredible control and power. Sold separately, only \$69.95. (If you buy the Turbo New Pack, the price drops to just \$47.50.)

Holiday Gift Packs,
Turbo GameWorks™
& Turbo Editor Toolbox™

Available at better dealers nationwide. Call (800) 556-2263 for the dealer nearest you. To order by Credit Card call (800) 255-8008, CA (800) 742-1133

<p>The holiday packs include an upgrade coupon for disk options so you get BCD and 8087 support for \$39.95 (regularly \$55.00)</p> <p>Carefully describe your computer system</p> <p>Mine is: 8-bit — 16-bit 1-yr — PC-DOS — MS-DOS — CPM-80 — CPM-86</p> <p>My computer's name and model is _____</p> <p>The disk size I use is: 3 1/4" — 5 1/4" — 8"</p> <p>Name _____</p> <p>Shipping Address _____</p> <p>City _____ Zip _____</p> <p>State _____</p> <p>Telephone _____</p>	<p style="text-align: center; border: 1px solid black; border-radius: 50%; padding: 5px; font-weight: bold;">*Gift Pack Offers Last Until March 31, 1986</p> <table border="0" style="width: 100%;"> <tr> <td>*Turbo Holiday Jumbo Pack</td> <td>\$245.00</td> </tr> <tr> <td>*Turbo Holiday Pack</td> <td>\$125.00</td> </tr> <tr> <td>*Turbo New Pack</td> <td>\$95.00</td> </tr> <tr> <td>Pascal</td> <td>\$109.95</td> </tr> <tr> <td>Pascal w/8087</td> <td>\$109.95</td> </tr> <tr> <td>Pascal w/BCD</td> <td>\$124.95</td> </tr> <tr> <td>Pascal w/8087 and BCD</td> <td>\$154.95</td> </tr> <tr> <td>Turbo Database</td> <td>\$54.95</td> </tr> <tr> <td>Turbo Graphics</td> <td>\$34.95</td> </tr> <tr> <td>Turbo Tutor</td> <td>\$69.95</td> </tr> <tr> <td>Turbo Editor</td> <td>\$69.95</td> </tr> <tr> <td>Turbo GameWorks</td> <td>\$69.95</td> </tr> </table> <p>These prices include shipping to all U.S. cities. All foreign orders add \$10 per product ordered.</p> <p>Amount (CA add 6% tax) _____</p> <p>Payment: VISA MC Check Bank Draft _____</p> <p>Credit Card Expiration Date: _____ / _____</p> <p>Card # _____</p>	*Turbo Holiday Jumbo Pack	\$245.00	*Turbo Holiday Pack	\$125.00	*Turbo New Pack	\$95.00	Pascal	\$109.95	Pascal w/8087	\$109.95	Pascal w/BCD	\$124.95	Pascal w/8087 and BCD	\$154.95	Turbo Database	\$54.95	Turbo Graphics	\$34.95	Turbo Tutor	\$69.95	Turbo Editor	\$69.95	Turbo GameWorks	\$69.95
*Turbo Holiday Jumbo Pack	\$245.00																								
*Turbo Holiday Pack	\$125.00																								
*Turbo New Pack	\$95.00																								
Pascal	\$109.95																								
Pascal w/8087	\$109.95																								
Pascal w/BCD	\$124.95																								
Pascal w/8087 and BCD	\$154.95																								
Turbo Database	\$54.95																								
Turbo Graphics	\$34.95																								
Turbo Tutor	\$69.95																								
Turbo Editor	\$69.95																								
Turbo GameWorks	\$69.95																								

NOTE: Turbo Editor Toolbox and Turbo GameWorks are available for the IBM PC and true compatibles using Turbo Pascal 3.0 ONLY.

COD's and Purchase Orders will not be accepted by Borland International. California residents add 4% sales tax. Outside USA add \$15 and more. Payment by bank draft, payable in U.S. dollars drawn on a U.S. bank.

QUANTUM LEAP

billion bits of RAM will be produced, and in 1990 memory production will be 2,184,479 billion bits—about 22 times this year's total.

These numbers are too big to comprehend easily, so I converted the yearly totals to something simpler to visualize—the number of megabytes of RAM produced

The amount of dynamic RAM that will be cranked out each year is staggering. Dataquest estimates that 1985 memory production has been 99.4 trillion bits. By 1990, it will be about 22 times this year's total.

per minute, assuming all of the memory factories run 24 hours a day, 365 days a year. During 1985, almost 24 megabytes of RAM were produced every minute of every day. In 1988 that number will increase to 171 megabytes per minute, and in 1990, 520 megabytes of RAM will be made each minute.

However, only a portion of the total memory produced is used in personal computers. According to Dave Wilson of Future Computing, 7.3 million personal and home computers were sold in 1985. This category includes everything from small multiuser systems down to home computers such as the Apple II. Next year sales are expected to reach 9.2 million units, growing to 13.7 million in 1988 and to 18.1 million computers in 1990. The total number of personal computers in use during 1985 is estimated at 25.7 million. By 1990, 72.9 million will be in use.

Megabytes for Micros

Future Computing's research indicates that about 20 percent of the total RAM production is used in personal computers. Wilson says that in 1988, an average office PC will have 1.45 megabytes of RAM, while the average home computer will use slightly more than 600K. These figures refer only to main memory used by programs, excluding things like RAMdisks and display memory for graphics.

I think the average personal computer used in business will soon have a much bigger complement of RAM than Future Computing predicts. Unless these 2-megabyte PC memory boards that sell for \$500 for some reason become unavailable (which doesn't seem likely), you'll see lots of 2.6-megabyte personal computers in 1986. By 1988 machines with 8 megabytes of memory will be as popular as 640K systems are now. In 1990, 16-megabytes will be common, and advanced users will probably have 64 megabytes of RAM. (I can't wait to hear someone complaining about having "only" 16 megabytes!)

PC memory board makers are already designing the next wave of products. John Henderson of Tall Tree Systems says he's thinking about an 8-megabyte memory board built with today's inexpensive 256K chips. He plans to use "surface-mount" chips, which take much less room than the standard DIP chips that plug into sockets. Since surface-mount chips are also very thin, Henderson claims he can put chips on both sides of the board. Think about it: When 1-megabit chips come down in price in a year or two, the same board could have 32 megabytes of memory, and in 1990 a similar expansion board using 4-megabit chips could have a capacity of 128 megabytes.

Although surface-mount memory chips reduce board space, the chips have to be installed by machine at the factory. Hence a memory board made with surface-mount chips must be sold fully populated—unlike the conventional, partially filled board that you can upgrade later by plugging in extra chips. However, AST Research, another company that makes boards with surface-mount chips, plans to take a different approach, says its vice president and co-founder, Tom Yuen. According to Yuen, AST will surface-mount support chips to save space, but will continue to use standard DIP-style memory chips so that users can add memory later.

Memory Manipulation

With these inexpensive RAM boards, personal computers will soon be able to have as much memory as mainframes do now. Some users are already exploring ways to use lots of memory. For example, Robert Holcomb, a systems analyst for

MDBS, has been experimenting with 8 megabytes of EMS memory in an AT, using battery backup so that data doesn't disappear if there's a power surge. Holcomb says that with a 7-megabyte *Knowledge-Man* database stored entirely in memory, he has measured an overall 500 percent speed-up in processing compared with that of the fast AT hard disk. This dramatic speed improvement is due to the heavy amount of random access in the database application, but even sequential access of files on a RAMdisk is more than twice as fast as the AT's hard disk. Although not every application needs such blinding speed, Holcomb thinks the performance improvement gained by spending \$2,000 on extra memory is impressive.

Even though it will soon be practical to have enormous amounts of RAM in a personal computer, you don't need to worry about there ever being too much memory. New types of programs, such as expert systems written in LISP and PROLOG, will easily consume as much memory as

It won't be long before the almost 200K of memory that a system like Top View requires will be considered trivial—hardly worth complaining about.

you can afford. It won't be long before the almost 200K of memory that a system like Top View requires will be considered trivial—hardly worth complaining about.

You want a RAM-resident 180K dictionary so your spelling checker can rip along at the speed of light? No problem: Right now that much memory costs less than \$40. The same applies to high-resolution bit-mapped graphics: With a megabyte of memory you can have a 1,024-by-1,024 pixel display with 256 colors per pixel, at a cost of only \$250 on a PC board.

But should the semiconductor factories somehow run amok and flood the market with more memory than we can use, Dataquest's Susan Scibetta has a solution: Just grind up all those silicon chips and turn them back into beach sand. ■

Borland's SuperKey And SideKick Work So Well Together, You'll Hardly Work At All.

AN UNBEATABLE TEAM AT AN UNBEATABLE PRICE! We've teamed the best with the best to make the greatest. The best keyboard enhancer, Superkey®. The best desktop organizer, Sidekick®. The dynamic duo working hand in hand to let you do many different things at once. A way that cuts down the keystrokes, so you're working instead of just typing. A way that wasn't possible until we paired the electronic wizardry of Superkey with the practical efficiency of Sidekick. Superkey brings the magic. Sidekick does the details. The "S-Team" works beautifully together because we designed them that way.

GET SUPERKEY AND SIDEKICK TODAY and you'll have an unbeatable team at an unbeatable price — and a \$15 rebate back in the mail.



SIDEKICK INCLUDES: * Calculator * Notepad * Auto dialer & phone directory * ASCII table * Perpetual calendar & datebook * Help window * Full-screen editor with word-wrap, paragraph editing and much much more.

(Chances are that once you have SuperKey and SideKick working together for you, you'll never need to use a word-processing program again).

SUPERKEY INCLUDES:
 *Encryption to keep confidential files confidential * Programmable keys that let you turn a thousand keystrokes into one * Keyboard lock * Automatic turn-off of your screen after a pre-set time so the expensive phosphorus in your monitor's screen isn't etched or ruined * Secret Password protection and more.

IF YOU USE SIDEKICK, YOU NEED SUPERKEY.
BECAUSE SUPERKEY AND SIDEKICK CAN MAKE
YOUR DAY GO SOMETHING LIKE THIS:

8:00 am. You got to work on time, despite the 44-mph turkey ahead of you in the fast lane. It's spreadsheet time. You hit one key: Lotus 1-2-3 (or whatever) is up and running. (One key, because SuperKey has recorded all the CD's: 123 <ENTER> 123< ENTER> <ENTER> / F <ENTER> R <ENTER> SALES <ENTER> <PgDn> foolishness and your one keystroke played all that back instantly. One keystroke instead of a minute!)

8:02 AM: You're into the spreadsheet. Phone rings. You kick in Sidekick's Notepad—without leaving your spreadsheet. You talk. You listen to Frank. You make notes that tell you that Frank is upping the numbers from yesterday's order and he needs a new price and delivery date. He wants a meeting. Fast, but when? You have Sidekick fire up your Calendar. Time agreed and noted—in Sidekick's Notepad. Conversation ends. Your spreadsheet is still there.

8:07 am. You're watching the spreadsheet but you're thinking about the new bid you have to figure out. So you have SideKick's Calculator pulled up on the screen—over a small piece of the spreadsheet—which doesn't go away

8:08 am. SideKick is coming up with new numbers. SuperKey keeps the spreadsheet on a roll. Satisfied with the numbers, you have SideKick auto-dial Frank's number. Talk. Talk. Hang up.

8:09 am. Spreadsheet about done. You're watching it, but thinking about what Frank just said on the phone. He liked your numbers. He ordered. He said, "That was fast. We won't need that meeting. (SideKick cancels it from your Calendar). And he also said, "How did you get all that done so quickly?" And you said, "I've got a couple of new girls working for me."

IF YOU DON'T USE SIDEKICK YET, YOU GET THEM BOTH AND FOR A LIMITED TIME, A \$15.00 CASH-BACK! Because Superkey and Sidekick are so compatible, we let them move in together. Into their own blister-pack. With the \$15.00 cash-back coupon and the manuals. Which is what you get for \$139.90 instead of the usual \$154.90. You need to fill-in the cash-back coupon, along with your registration cards and proof of purchase, and mail it back. We'll cash you your \$15.00 rebate right away. Rebate offer ends March 31, 1986. (PS: You can still buy Superkey and Sidekick separately. Superkey **\$69.95**. Sidekick **\$84.95**. Not covet-protected.)

THE CRITIC'S CHOICE

"If you want the ultimate in sophistication, you won't find any thing finer on the battlefield right now than Barland's SuperKey and Jodelich combo." **LEON A. WORTMAN**, *John Birch*



BORLAND
INTERNATIONAL

4585 Scotts Valley Drive, Scotts Valley CA 95066
Phone: (408) 438-8400 Telex 172373

SuperKey **SIDEKICK**

SuperKey and SideKick require DOS version 2.0 or later.
Software for your IBM® PC, XT, AT, 3270, PCjr and true compatibles.

Yes, I want the Best!

Yes, I want	Quantity
The SideKick SuperKey	

The SideKick SuperKey
from \$154.99

\$45 cash back ONLY when
purchased together. Both come
only protected.

SuperKey \$89.95

Sidekick 554 99
(copy protected)

Sidekick ~~\$84.95~~
and copy protected

Subtotal _____

ICA no. 20357a 1991

Amount Enclosed
 Payment ☐ VISA ☐ MC

Credit Card Exp. Date _____

Case # 111111

\$15⁰⁰
Cash
Back

SuperKey only—Outside USA and Canada:
Due to US Government restrictions on export of
technology, purchase of SuperKey (without DSS)
is available through authorized distributors.

SideKick only: PCjr requires the not copyrighted version.

\$15 cash-back rebate upon receipt of signed license agreement, cash-back coupon and proof of purchase. Your \$15 cash-back rebate includes tax when applicable. (These prices include shipping to all U.S. cities. All foreign orders add \$10 per product ordered.)

Name _____

Shipping Address _____

City _____

State _____ Zip _____

Telephone _____

COO's and Purchase Orders WILL NOT be accepted by dealer. California residents: add 6% sales tax.
 *Add \$10 and make payment by bank draft payable in US dollars drawn on a US bank.



NUMBER SMASHER™

Triple your PC speed for only \$799!

8087 Upgrades™

MicroWay is the world leader in 8087 support. Our 8087 development software has been in use since 1982. By 1984 we had become Intel's 97th largest OEM account. When you buy from us, you can be confident that you will receive the 8087 chip designed for your PC and that our unique diagnostics will instantly verify that your processor works correctly as installed. Call for current prices.

287Turbo™

This card plugs into the 80287 socket on your AT or COMPAQ, doubling the 80287 clock from 4 to 8 Mhz. It does not change the 80286 clock speed or affect your warranty. The card comes with an 8 Mhz 80287 and has provisions for faster crystals as better 80287s become available. It also has a reset button and circuit that provide a hardware alternative to CTRL-ALT-DEL. 287Turbo with Diagnostics and Reset **\$395**

Number Smasher™

Number Smasher gives you AT speed and 100% compatibility with all PC software and hardware. It comes with a 10 Mhz 8086 and 512K of no wait state RAM. Most are shipped with an optional matched 10 Mhz 8087 and 128K daughterboard. The card runs programs a factor of 2.5 to 4.0 faster than the PC, XT or compatibles it runs in. Other features include FASTROM, a Ram Disk, Print Spooler and Disk Cache. Revision 2 of the Smasher is designed and manufactured by MicroWay in the U.S.A. and has the best service and support of any accelerator card.

MegaPage™

MicroWay's "Lotus/Intel" extended memory card has all the features of the others plus one: it uses low power, cool running CMOS DRAM. Ask for our pamphlet "Extended vs Expanded Memory" and learn why MegaPage is the right card for you. MegaPage with 2 Megabytes CMOS **\$549**

**Micro
Way**

The World Leader in 8087 Support

P.O. Box 79, Kingston, Mass. 02364 USA (617) 746-7341
Tempo House, London, U.K. call 01-223-7662

Number Smasher, MegaPage and 287Turbo are trademarks of MicroWay, Inc. MicroWay is a registered trademark of MicroWay, Inc.

CIRCLE 154 ON READER SERVICE CARD

www.rightad.com/rol

'Tis the Season To Be Floppy

With tongue planted firmly in cheek, PC Magazine's contributing editor Stephen Manes takes a quick look at some of the more promising computer gift ideas for the holiday season.

Tinny-tiny speakers gaily troll the ancient yuletide carols. Halls are decked with cheery dot matrix printouts of firs, mistletoe, Judas Macabaeus, and Santa Smurf. Blazing Yule logs and menorahs glowingly etch themselves into the phosphors of Enchanted Graphics Monitors. Bustling point-of-purchase terminals dressed in holiday style wish you thermal greetings of the season. Merry spreadsheets on every desk herald the angelic tax joy of giving your accountant a stack of deductions for FY '85. It's a computer Christmas!

Just poring over the rotogravure wish books as they playfully bestrew your abode produces the warm mercenary glow that some say is the true meaning of the season. And since both my readers have inundated me with letters asking for Christmas gift suggestions and warnings, I'll try to oblige with good will to all.

Santa's Software

Supertanker Simulator: Everybody enjoys games, but few adults have the eye-hand coordination they used to. This novel real-time simulation makes you the captain. In practice mode, thrills are few and far between after clearing the harbor. With the full weather and reality options, however, the average 10-day game gets significantly more interesting as you interact with tidal waves, sea gulls, mutinous crewmen, petroleum spills, and a big white whale. The multitasking option lets you check your progress while you tend to business. Just don't turn off your computer at the end of a long day.

Bug Log: This latest entry in the growing line of memory-resident software auto-

matically stores recent keystrokes and screens so the user can pinpoint bugs in new programs. Be sure to get Version 1.1: An insidious error in earlier editions created a nasty endless loop.

Personal Best: That lonely guy or gal



Stephen Manes

on your list can now better the odds when answering ads in personal columns. After learning a few facts about the user's hobbies, physical characteristics, pet peeves, and life-style, this program's mail-merge features and massive euphemism thesaurus ("Rubenesque," "full-figured," "impetite," and "muscular" for "fat") generate customized "guided missives" designed to get results.

Instant Expert: Explore the world of state-of-the-art artificial intelligence techniques with this useful software tool. Included is a model system designed to tell whether something is animal, vegetable, or mineral within 20 questions ranging from "Can it swim?" to "Does it have

hairy roots?" But that's just a starting point, with the help of the simple menu-driven prompts, it took me less than a day to come up with a system to help vegetarians tell fruits from red meat.

April Fool! Lurking in memory unbeknownst to the user, this versatile new "worm" crashes any machine whenever you choose—or totally at random. User-selectable parameters allow warm boot or cold, trashing of disk files or sectors, and much more. Tons of fun; just make sure it doesn't duplicate the functions of many programs you may already own.

Pundit: A repackaged version of the popular *The Sky's the Limit*. As before, you play industry analyst and predict trends in the computer industry. The new version corrects last year's bug that gave players the greatest rewards for the most outlandish forecasts, and it features the real-life analysts' most hilarious bloopers and blunders. Still, the playing hint that "Cassandra died poor" remains as valid as ever.

Old Computer's Almanac: Designed for anyone working on programming projects, this patch to *SideKick*'s calendar effortlessly takes promised delivery dates and adds on 6 months to 5 years. The algorithm takes into account holidays, leap days, past performance, phases of the moon, and even incoming recruitment calls.

Rate Your Mate: This low-cost little gem establishes once and for all just how IBM-compatible your computer is on a simple 100-point scale. Note: This program requires an IBM PC or XT. It does not work on other machines, including the PC AT, PCjr, and Portable PC.

YOU FORCED US TO MOVE!

...and We Love You
For It!

LOGICSOFT



Because of the tremendous response you've given to our **FREE OVERNIGHT DELIVERY** and ***10 OFF** policies, our growth has been phenomenal! Even we did not project how rapidly we would expand. Quite honestly there were times when it seemed like the whole country was trying to place an order...at the same time!

We realize that some of you have had problems getting through (our phones simply could not handle the volume) and, yes, some have even gotten their shipments late (our shipping department has been on a 12 hour schedule). To those of you, **WE APOLOGIZE** for the inconvenience and would like to say **THANK YOU** for your patience.

A one million dollar investment has allowed us to solve these problems...we've just moved into our new World Headquarters, beefed up our sales department, added a spanking new phone system and built a fully automated warehouse.

Oh, sorry, we almost forgot "Harold" (who's extremely fast, but very sensitive) our new 100 terminal computer system. He's designed to speed up order processing to get your shipments out the door...fast. Sorry Harold.

INTERNATIONAL ORDERS

EUROPE Announcing Logicsoft Europe!

Our European friends may now order directly through our Amsterdam Distribution Center, which carries the latest factory fresh versions of the most sought after IBM PC software and hardware. Now you can receive your order fast and still take advantage of the incredible savings that only mail order can offer. Please call or telex to confirm pricing & policies. Telex, 10759 Logic NL.

Call 020434684 or mail orders to:
LOGICSOFT EUROPE BV
PO 8460, 1006 AL
AMSTERDAM, HOLLAND

CANADA

For our Canadian customers we've installed a special local number, 416-283-2354. Now you can get the biggest savings in mail-order for the cost of a local call. Or, if you wish, Telex 266905 Soft UR.

FAR EAST AND AUSTRALIA

Call 516-249-8440 and ask for our International Department. They're experts on export and you get to take advantage of our great mail order prices. Telex 266905 Soft UR. Please call or telex to confirm pricing & policies.

WE WILL BEAT
ANY PRICE BY

\$10

See Our Card for Details

FREE

Overnight Delivery

See Our Card for Details

**EVERYTHING YOU ALWAYS
WANTED TO KNOW ABOUT
BEATING A PRICE BUT WERE
AFRAID TO ASK...**
or How I Learned To Save Money
Without Really Trying.

We know there are still a few of you who have shied away from ordering from us (you know who you are) perhaps thinking our \$10.00 off and **FREE** overnight policies were a "gimmick" or a "come-on" to pressure you into something.

We'd like to tell you how simple it really is. Just pick up the phone and dial 1-800-645-3491, then tell your sales agent: "he's not," the name and date of the publication and who you want us to beat. No gimmick, no come-on, it's that easy.

CONFUSED OVER ACCOUNTING SYSTEMS?



We don't blame you, that's why we invite you to give us a call. We've evaluated over 50 of them and just because you can save a lot of money buying mail order shouldn't mean you have to sacrifice service...We want to take the time to assist you before you buy. We realize that an accounting system can add up to a sizeable investment and helping you end up with the right package for your money is what doing business is all about.

ACCOUNTING SYSTEMS

Information Unlimited (IUS)	Open Systems	Great Plains	Peachtree Series 8	State of The Art	Realworld (MBSI)	BPI
Accounts Payable	*299	*409	*499	*389	*479	*395
Accounts Receivable	*299	*409	*499	*389	*479	*395
Fixed Assets	---	*409	---	*389	---	---
General Ledger	*299	*409	*499	*389	*479	*395
Inventory	*299	*409	*499	*389	*479	*395
Job Costing	---	*409	*499	*389	---	*539
Material Management	---	*409	---	---	---	---
Order Entry/Processing	*299	*409	---	*389	*479	*395
Payroll	*365	*409	*499	*389	*479	*395
Report Writer	---	*409	---	---	---	---
Sales Invoicing	---	---	---	*389	*479	---
Purchase Order Entry	---	409	---	---	---	---
TCS Client Ledger System	*1195					

JUST A PARTIAL LISTING OF ACCOUNTING SYSTEMS - CALL TODAY!

CIRCLE 282 ON READER SERVICE CARD

LOGICSOFT®

THE LOGICAL CHOICE
A Member of the Logic Group



110 Bi-County Blvd., Farmingdale, N.Y. 11735

1-800-645-3491

In New York State...516-249-8440 • In Canada...416-283-2354
Customer Service 1-800-431-9037

See following pages for Software, Hardware, Special Order Dept., Programmers Dept., PC Jr. Corner and our Computer Forms Division.

TEAR AND COMPARE! TEAR AND COMPARE! TEAR AND COMPARE! TEAR AND COMPARE! TEAR AND COMPARE!

**LOGICSOFT INCREDIBLE
NEW SERVICE BREAKTHROUGH**

FREE OVERNIGHT DELIVERY!

On Orders Totalling
over \$100... Shipped
UPS FREE!
Under \$100
(Within Continental
U.S.)

VIA...  **Purulator
courier**

**PLUS...IF YOU CAN FIND A LOWER PRICE
We'll Beat \$10
It By....**

THAT'S RIGHT! OUR LOWEST PRICE GUARANTEE IS STILL EFFECTIVE!
Tell us the advertiser and price of any software or hardware item on these pages currently advertised in any popular computer publication and we'll beat that price by \$10. This offer does not apply to items under \$100 or where the price is not lower than Logicsoft's. NO DEALER'S PLEASE!

SOFTWARE for IBM PC

WORD PROCESSING

Wordstar 2000	\$256
WORDSTAR 2000 PLUS	305
Wordstar Pro Pac	295
Wordstar Pro Plus	345
WORD PERFECT (New Release)	225
Microsoft Word	235
Spellbinder	Lowest Price
MULTIMATE	240
Volkswriter Deluxe	185
Peachtext 5000	199
Easywriter II/Speller/Mailer	195
Edix & Wordix	255
Finalword	225
Samira III	325
Xy Write II Plus	255
Think Tank	125
pls: WRITE	95
Wordplus PC with Boss	359

DATA BASE MANAGEMENT

KNOWLEDGEMAN	\$256
Cornerstone	Lowest Price
Tm IV	185
R-Base 4000	283
R-BASE 5000	355
DB Master	475
d Base II (New Release)	299
Condor III	349

DATA BASE MANAGEMENT (cont.)

d BASE II	\$369
Clipper (d Base II Compiler)	399
Qata Base Manager II (alpha)	175
Infostar plus	155
Friday	199
pls: file & pls: report	165
REVELATION	745
Powerbase	255
Personal Pearl	225
Easyfile	235
Superfile	155
Guru	1995

INTEGRATED/SPREADSHEETS

LOTUS 1-2-3 (v2.0)	\$305
Enable (New Version)	399
Smart Series	575
Ability	335
FRAMEWORK	359
Open Access	395
Electric Desk	229
SYMPHONY (Limited Quantity)	429
Supercalc 3	175
Multiplan	129
TK Solver	279
pls: plan	55

FINANCIAL

DOLLARS AND SENSE	\$115
-------------------	-------

FINANCIAL (cont.)

Financier II	115
MANAGING YOUR MONEY	\$115
Home Accountant Plus	95
Howard Tax Preparer	135
Professional Tax Planner	315
Fixed Asset System (BEST)	439
Market Manager Plus (Dow Jones)	179
Market Analyzer (Dow Jones)	299

GRAPHICS

CHARTMASTER	\$275
Signmaster	195
BPS Graphics	289
Fast Graphs	295
pls: graph	35

GRAPHWRITER

Graphwriter Combo Pak	359
DIAGRAM MASTER	155
Microsoft Chart	175
ENERGRAPHICS	259
Energographics with plotter option	325
PC Draw	295
Gem Draw (incl. Desk Top)	95

PROJECT SCHEDULERS

MICROSOFT PROJECT	\$185
SuperProject (IUS)	245
HARVARD TOTAL PROJECT MGR.	295
Project Scheduler (Scitor)	245
Project Scheduler 5000 (Scitor)	275

SOFTWARE UTILITIES for IBM PC

WORD PROCESSING

FANCY FONT	\$159
Wordplus (Oasis)	115
pls: proof	85
Punctuation & Style	95
Spellix	59
Wordperfect Sorter	75

DATA BASE

Quickcode III	\$155
d Graph III	175
d Util III	65
k Graph	175
k Paint	95
k Text	105

DATA BASE (cont.)

Clout 2	\$145
Extended Report Writer	115
Sideways	45
GENERAL	95
PROKEY 4.0	\$99
Norton Utilities (New Release)	95
SIDEXICK (unprotected)	55

GENERAL

CROSSTALK XVI (New Release)	\$115
Smartcom II	105
Sideways	45
Copy II PC	35
DESK ORGANIZER	95

Prices & policies subject to change without notice.

Immediate Replacement on any Defective Product.

• NO SURCHARGE for VISA or MasterCard • No Sales Tax on Orders Outside N.Y. State • Purchase Orders
Welcome from Qualified Institutions • NO SURCHARGE (Phone call for price verification) • Please call 1-800-645-3491
for handling and insurance (all orders add \$1) • Payment: MasterCard, VISA, American Exp., C.O.D. Money Order or Check

National Sales
Hot Line

1-800-645-3491

Customer Service 1-800-431-9037

New York State...516-249-8440

Canada...416-283-2354

Domestic/International Telex...286905 Soft UR

LOGICSOFT

THE LOGICAL CHOICE

A Member of The Logic Group

110 Bi-County Blvd., Farmingdale, N.Y. 11735



SEE OTHER SIDE
FOR MORE SAVINGS!

WE WILL BEAT
ANY PRICE BY
\$10

See Other Side for Details

NEW! Expanded Special Order Dept.

We know there are many products that simply cannot be found through mail order. We've solved that problem...just ask for our SPECIAL ORDER department...We've got the suppliers ...still at low mail order prices!

FREE

Overnight Delivery
See Other Side for Details

PC JUNIOR CORNER

SOFTWARE

Lotus 1-2-3 (While they last)	\$309
Wordstar	149
Electric Desk	189
HARDWARE	
Captain 128K (1 term)	339
PC Mouse (Mouse Systems)	129

HARDWARE (Cont.)

Keytronic 5151 Keyboard	\$179
Keytronic 5149 Num. Keypad	50
Jr. 128K Booster (Microson)	145
Quadram Expansion Chassis	519
Quadram Exp. Memory	235
Quadram Jr.	219

NEW PRODUCTS ADDED DAILY...CALL!

PROGRAMMER'S DEPT.

Concurrent PC DOS (w/ramdisk)

Pascal PT + (PC DOS)	\$349
PL/1 - (DR)	489
Display Manager - (DR)	359
Access Manager - (DR)	269
LATTICE C COMPILER	305
C Food Smorgasbord	119

Pascal Compiler (MS)

C Compiler (MS)	\$305
Microsoft Sort	159
Cobol Compiler (MS)	479
Business Basic (MS)	289
FORTH COMPILER (MS)	229
C88 C Compiler	
(Computer innovations)	345

GENERAL HARDWARE

PRINTERS*

DIABLO	
36**	\$1229
025**	619
530 ECS**	1799
EPSON	
L01500	\$1199
Parallel Interface	79
JX-80	599
LX-80**	265
LX-80 Tractor/Feeder	399
RX-100	379
FX-80 Plus**	379
FX-185 (New)**	569
JUDO	
6100	\$439
5300	799
MANHESMANN TALLY	
Split 80	\$279
160	579
180	649
NEC	
2030**	\$719
2050**	895
3530	1329
3550	1395
8850**	1949
Pimwriter P2**	675
Pimwriter P3**	895
OKIDATA	
182P	\$239
84-IBM	789
192 IBM	409
193P	559
2410P	2295
QUME	
Sprint 11/40**	\$1299
Sprint 11/55**	1685
Sprint 11/90**	2199
SILVER REED	
400	\$279
770	795
TOSHIBA	
P351 Tractor	\$165
P351	1375
1340	539
CITIZEN	
MSP10	\$315
MSP15	455
MSP20	455
MSP25	695

MONITORS*

AMDEK	
Color 300	\$255
Color 500	389
Color 600	479
Color 710	579
12" Green 300G	135
12" Amber 300A	145
12" Amber 310A	169
PRINCETON GRAPHICS	
RGB HX-12	\$459
RGB SR-12	599
Scan Doubler Board (for SR 12)	165
Amber Max 12E	185
QUADRAM	
Quadchrome 12"	\$465
Quadchrome 17"	1595
Quadchrome II 14"	465
Amberchrome 12"	155
TAXAN	
100G	\$125
105A	135
121	149
122	149
210	259
420	409
440	699

MULTI-FUNCTION BOARDS

AST RESEARCH	
Sox Pak Plus (64k)	\$249
Mega Plus II (64k)	275
Mega Pak (256k)	359
Advantage (128k)	429
UQ PlusII	135
ORCHID	
Blossom (D k)	\$235
QUADRAM	
Quadboard (64k)	\$245
STB	
Super Rio (64k)	\$329
Rio Plus II (64k)	259
Rio Grande	376
Grande Byte	275
Chaffeur	Lowest Price
TECMAR	
Captain	\$199

COMMUNICATIONS BOARDS

AST	
AST 5251-11	\$699
AST-SNA	699
AST BSC	599

COMMUNICATIONS BOARDS (cont.)

AST-3780	749
DCA	
IRMA Board	\$949
QUADRAM	
Quadlink	\$449

GRAPHICS BOARDS

AST	
Monograph plus	\$425
Preview	279
EVEREX	
Graphics Edge	\$309
The Edge	299
HERCULES	
Graphics Card	\$299
Color Card	189
MA SYSTEMS	
Peacock Color Board	\$245
PARADISE SYSTEMS	
Multi-Display Card	\$215
Modular Graphics Card	269
Options A & B	Lowest Price
QUADRAM	
Quadcolor I	\$195
Quadcolor II	465
SIGMA	
Color 400	\$549

STB	
Graphics Plus II	\$315
TECMAR	
Graphics Master	\$489
TSENG LABORATORIES	
Ultra Pak	\$545

MODEMS

HAYES	
Smartmodem 300	\$206
Smartmodem 1200	445
Smartmodem 1200C (Smartmodem II)	349
Smartmodem 2400	719
NOVATION	
Access 1-2-3	\$475
Smart Cat Plus (Int.)	355
Professional 2400	559
PROMTECH	
Popcom X100	\$379
Popcom C100	355
PROMTECHUS	
Pro modem 1200	\$375
Pro Modem 1200B	319

MODEMS (cont.)

QUADRAM	
Asher	\$395
Quadmodem 2000	315
Quadmodem 2024	499
Quadmodem 2100	375
Quadmodem 2124	565
RACAL VADIC	
Maxwell 1200 PC (w/SIM)	\$239
Maxwell 1200 V (w/SW)	239
2400 V	435
VEN-TEL	
PC Modem Half Card	\$379
PC Modem 1200	399
1200 Plus	399

BACK-UP DEVICES

ALLOY	
PC Quick Tape (60MB)	\$1719
SYSGEN	
Image (10MB)	\$835

MOUSE INPUT DEVICES

MOUSE SYSTEMS	
PC Mouse w/paintbrush	\$139
MICROSOFT	
Microsoft Mouse (Serial)	\$149
Microsoft Mouse (Buss)	139

SURGE PROTECTORS

KENNINGTON SOFTWARE	
Master Piece	\$116
CURTIS	
Diamond	\$39
Emerald	49
Sapphire	59
Ruby	69

KEYBOARDS

KEYTRONIC	
5150	\$159
5151 (Deluxe)	175
51528	545

MEMORY CHIPS

64k (200ns)	\$35
256k (150ns)	69

DISKETTES

LOGICTRAK 5 1/4" - 100% GUARANTEED	
Duoite size, Double density, 10 per box	
20 + boxes	per disk \$2.35
10-19 boxes	per disk \$2.50
2-9 boxes	per disk \$2.99
1 box	per disk \$3.99

*Due to weight restrictions, Printers and Monitors are shipped UPS...FREE

**Parallel interface req...Ask sales agent

NO SURCHARGE for VISA or MasterCard • No Sales Tax on orders (outside N.Y. State) • Purchase Orders Welcome from qualified individuals • NO CASH/COIN • Please call for price restrictions • Please call for handling and insurance (not 1 order only) • Payment: MasterCard, VISA, American Exp. C.O.D. Money Order or Check

National Sales
Hot Line

1-800-645-3491

Customer Service 1-800-431-9037

New York State...516-249-8440

Canada...416-283-2354

Domestic/International Telex...286905 Soft UR

LOGICSOFT

THE LOGICAL CHOICE

A Member of The Logic Group

110 Bi-Country Blvd., Farmingdale, N.Y. 11735

TEAR AND COMPARE!

TEAR AND COMPARE!

TEAR AND COMPARE!

TEAR AND COMPARE!

COMPUTERS IN SOCIETY

Hardware Heaven

Computer Classics: On the heels of Coca-Cola Classic, trendy computer manufacturers are returning their huge inventories to the market under this new marketing scheme. The familiar TI Classic is the TI 99/4A with a new nameplate, an "Old Reliable" tape drive, and a tie-in with the Roy Rogers Restaurants' "Slow down" campaign. The Cabbage Patch Classic brings back the Coleco Adam in a puffy kapok-stuffed cabinet complete with birth certificate. The Apple Classic resurrects the Apple III with the catchy slogan "It works!" And of course, the Classic Chiclet is good old Junior with a dazzling retro-style box and keys "that'll remind you of your favorite gum."

Radiamp: Every computer transmits radio-frequency interference, but some are pitifully weak. If you can't hear and see your efforts on your neighbor's TV or radio, this amplifier gives you a low-cost way of gaining the performance you've been missing. Savvy programmers can pop messages on screens and radios within a half-mile radius; even the bank teller machine is not immune!

Mickeycomputer: The cute monicker ("It's your minicomputer's best friend!" gushes the Disneyesque ad) belies a useful product that allows any mini on the market to run software for the Apple Macintosh on up to three terminals at once. PC users may want to wait for Mouseland's forthcoming product; the firm steadfastly denies industry rumors that its next offering, code-named "The Little Tramp," will be accounting software for an overlooked vertical-niche market.

ManuReader: Now you can tell the technical-support person "yes" when asked if you read the manual. An alternative input device, ManuReader hooks up to any standard game port and actually reads any manual out loud in soothing tones designed to put the user gently to sleep. No "learn while you snooze" effect is claimed for this device, however, although a ROM upgrade promises to translate any manual into organized, comprehensible Japanese English.

FoodStar: A standard RS-232 connector and a Cuisinart are all you need to latch on to the latest thing in robotics and process control. You'll time those mousses

the CopyCover (Patented) \$19.95

THE PERFECT COMBINATION — DUSTCOVER & COPYHOLDER

FLIP IT UP...

- Holds at copy at the proper viewing angle.
- Increases typing speed and accuracy.
- No straining to the side to read text.
- Makes desk space more efficient.



FLIP IT DOWN...

- Save money by protecting keyboard from harmful dust and dirt.
- Takes the place of traditional plastic "covers" that are unightly to look at and difficult to hide.
- Quantity discounts.
- Dealer & OEM inquiries invited.

CLIPS ON AND OFF IBM PC, AT OR XT KEYBOARD IN SECONDS.
MANUFACTURED IN BEAUTIFUL CLEAR ACRYLIC

Send check or m.o. to C-THRU Products, Inc.
6351 Lake Worth Rd., Suite 111
Lake Worth, FL 33463 (305)439-4333

Add \$3 shipping and handling per unit. Florida residents add 5% tax.

C-THRU
PRODUCTS, INC.

CIRCLE 118 ON READER SERVICE CARD

"If it weren't for Harris-Lanier..."

"We wouldn't be speaking to each other."

FOR YOUR INFORMATION,
OUR NAME IS
HARRIS

For more details on how Harris-Lanier can get your PCs to share information, call 1-800-241-1706.

HARRIS LANIER

CIRCLE 195 ON READER SERVICE CARD

Some things are easier to use than Tax Preparer.[®]

But not many. In fact, cutting tax preparation time with the most powerful tax package ever created is so easy, you hardly need to read the instructions.

Tax Preparer, by HowardSoft.

No wonder it's the #1 selling tax program in the nation. Matchless for both personal and professional use.

Just swat a few buttons on your Apple (II series), IBM-PC or compatible, and any one of over 20 common IRS forms flies onto your screen. Fill in your filing information just once, and you'll be able to manipulate the numbers in more ways than you can count.

Tax Preparer calculates quickly and accurately, makes

changes auto-

matically, all

under the latest IRS rules and regs.

Then it prints out your forms instantly, error-free, and ready to mail.

You can comb through your records to pin down your options whenever you want. And every year, HowardSoft offers inexpensive updates so your program never becomes obsolete.

The simple fact is, Tax Preparer has every feature you'll find in the more expensive tax programs, but at a fraction of the cost.

Tax Preparer.[®]

The professional tool
that's become a household word.

Ask your dealer about Tax Preparer's California State Supplement and our new Partnership Edition. Plus #1 selling Real Estate Analyzer. All from HowardSoft.

HowardSoft.[®]
The software investment
you can count on.

1224 Prospect St., Suite 150
La Jolla, CA 92037 (619) 454-0121

CIRCLE 327 ON READER SERVICE CARD



COMPUTERS IN SOCIETY

down to a microsecond! Current software is somewhat primitive, but a fully menu-driven upgrade will be available in the second quarter. Note: Does not work with Robot-Coupe models.

The Phone Revolution: This new hardware package promises to free your computer for useful tasks while your telephone is on-line. It looks just like a standard off-the-shelf IBM PC with a basic black phone and answering machine. Tests reveal that's exactly what it is.

Accessories: Caveat Emptor

The French Connection: This import purportedly gives you a length of every

Last year's chocolate disks have been supplanted by Computer Wursts—sausages in computer forms. Among the hottest sellers has been the Bratwurst (looks like the PCjr).

type of standard cable you can imagine and connector, along with a soldering iron, an attaché case, and full instructions.

Unfortunately, the instructions are not in English, the soldering iron requires a European outlet and current, and none of the jacks or cables were familiar to this reviewer. The person who finds this product under the tree on Christmas day is not likely to sing "Vive la difference!"

Wipe-All Hard Disk Cleaner: I received this one by mistake when I was ordering the RS-232 Clam Knife. It's a pretty sad package: two Handi-Wipes (impregnated, according to the label, with "data resolution chemicals"), six Q-Tips, a spray can of something that smells suspiciously like the Los Angeles atmosphere, and a sheet of instructions. "Every 3 months, carefully remove all screws on device and polish all visible surfaces," it recommends, despite common knowledge that opening a hard disk voids its warranty. This product is only for after-warranty maintenance, but Lemon Pledge works every bit as well and is less expensive.

FIND FILES IN A FLASH



EASY TO USE □ MENU-DRIVEN

DISKCAT - 5™

Reads Up To 32,000 File Names from Floppy or Hard Disks

- ✓ Optionally, add category and description to each entry
- ✓ Manual entries allowed for non-DOS disks
- ✓ Print all or part of catalog sorted by file name, extension size, date or by disk or category
- ✓ Print directory-listing labels to stick on disk
- ✓ Catalog an entire disk with one command or only selected directories
- ✓ Not copy protected

PRICE: \$69

PLUS \$5 SHIPPING & HANDLING
30-DAY MONEY BACK GUARANTEE

FORD SOFTWARE

4845 Willowbend Blvd.
Houston, Texas 77035
(713) 721-5205

MASTERCARD & VISA ACCEPTED □ DEALER INQUIRIES WELCOME

CIRCLE 105 ON READER SERVICE CARD

"So before Harris-Lanier showed up,
your PCs wouldn't share information?"

"And now they're working
together non-stop."



FOR YOUR INFORMATION,
OUR NAME IS
HARRIS

For more details on how Harris-Lanier can get
your PCs to share information, call 1-800-241-1706.



CIRCLE 106 ON READER SERVICE CARD



BPI Business Builder

BPI
SYSTEMS

A grand opening for your business.

Introducing BPI's newest and most innovative accounting software package: BPI Business Builder.

What's in it for you?

Well, if you're about to open a new business or have been open for business for quite some time, hold on to your seat. Because we're about to open 'er up and see what she'll do.

Eight tools in one package.

For openers, BPI Business Builder is a comprehensive system that provides you with four powerful accounting tools and four management tools in one flexible, fully integrated software package.

There's no other box of business tools like it.

On the numbers side, you've got

BPI's renowned General Ledger, Accounts Receivable, Accounts Payable, and Payroll functions working for you.

On the management side, there's Information Management, Spreadsheet, Business Graphics, and Word Processing.

On the bright side, BPI Business Builder allows you to convert your accounting data into easy-to-understand forecasts, analyses, presentations, and custom letters.

Use immediately after opening.

BPI Business Builder is sophisticated enough to handle your advanced business needs, yet is really very simple to learn. And easy to operate. As you grow, BPI Business Builder can easily

interface with other BPI accounting systems for greater accounting capacity and flexibility.

Which is why we recommend it for both new and established businesses.

If you're open to new ways to improve your business, contact your nearest BPI dealer or call us at 1-800-531-5252.

We can open up a whole new way of looking at your business. With BPI Business Builder.

BPI
SYSTEMS™

3001 Bee Cave Rd., Austin, Texas 78746

CIRCLE 348 ON READER SERVICE CARD

The personal computer that raised high performance to new heights.

If you work with high volumes of information,
you need answers fast.

You need a personal computer that's up to the task.

Which is why IBM created the Personal Computer AT[®] system. It's changed a lot of ideas about business computing.

The idea of "fast" has become much faster. The idea of "data capacity" has become far greater.

There are new definitions of "power" in a stand-alone PC. While phrases like "sharing files" and "multi-user systems" are being heard more often.

And surprisingly, words like "affordable" and "state-of-the-art" are being used *together*.

Clearly, the Personal Computer AT is different from anything that came before. And what sets it apart can be neatly summed up in two words.

Advanced Technology.

If you've ever used a personal computer before, you'll notice the advances right away.

To begin with, the Personal Computer AT is extraordinarily fast. That's something you'll appreciate every time you recalculate a spreadsheet. Or search through a data base.

It can store mountains of information—literally thousands of pages' worth—with a single "hard file" (fixed disk). And now you can customize your system to store up to

30,000 pages with the addition of a *second* hard file.

The Personal Computer AT runs many of the thousands of programs written for the IBM PC family. Like IBM's TopView, the program that lets you run and "window" several other programs at once.

Perhaps best of all, it works well with both the IBM PC and PC/XT. Which is welcome news if you've already made an investment in computers.

You can connect a Personal Computer AT to the IBM PC Network, to share files, printers and other peripherals with other IBM PCs—for a total office solution.

You can also use a Personal Computer AT as the centerpiece of a three-user system, with your existing IBM PCs as workstations.

Most important, only the Personal Computer AT offers these capabilities *and* IBM's commitment to quality, service and support. (A combination that can't be cloned.)

If you'd like to learn more about the IBM Personal Computer AT, see your Authorized IBM PC Dealer, IBM Product Center or IBM marketing representative. For a store near you, call 1-800-447-4700 (in Alaska, call 1-800-447-0890).

The IBM Personal Computer AT, for Advanced Technology.



IBM®

Minutes

2

1

0

Nicolet
Zeta 8

HP
7550

Adding a Touch of Color *24 Plotters: \$399 to \$5,950*

A good plotter can make the difference between a great presentation and one that's mediocre. One of the 24 reviewed here may have the combination of price and performance you're looking for.

The means to produce striking color graphics on hard copy, once limited to corporate art departments or outside graphic designers, have become accessible to average PC users in the business world. Whether the purpose of the artwork is to render an analysis in visual terms or enliven an otherwise pedestrian executive communication, colorful graphics are becoming increasingly important tactical weapons in the corporate arsenal.

Although you can create some pretty

spectacular graphics on a color display, these images must be transferred to paper or some other medium to permit wider circulation. Several new technologies address this need, including screen photography, direct registration of the image from computer to film, and ink jet or thermal transfer printers.

Nevertheless, the venerable old plotter is still the device of choice for graphic hard copy. Plotters offer several advantages over other graphics media: good resolution, reasonable speed, large output, mul-

DMP-51
111

Epson
80-111

PLOTTERS

multiple colors, stable and long-lived images, easy operation, and compatibility at a relatively low cost.

For this evaluation, *PC Magazine* selected a cross-section of plotters that can be used with personal computers. Most of these are desktop plotters, but one is a larger model capable of being used in CAD systems.

An even two dozen plotters are reviewed here. The prices cover a wide range: the highest priced—weighing in at almost \$6,000—costs more than 15 times the lowest; for your convenience, the reviews are presented in order of ascending price. Some are relatively simple devices for those of you just beginning to use hard-copy graphics, while others are commercial units for businesses with heavy graphics needs.

Plotter Types

Plotters have traditionally been divided into two major classes based on their paper and pen movement techniques (see sidebar, "Pens and Media"). *Flatbed plotters*—the first major class—anchor the media onto a stationary flat plate. The pen head is free to range anywhere over this surface to create the image. Complete coverage is generally achieved by moving an arm laterally along a fixed path, while the pen head is moved along this arm by a system of pulleys.

Drum plotters form the other major class. In a traditional drum plotter, the media is wrapped around a drum and anchored on both ends. The drum rotates while the pen head moves laterally along the fixed rail. This combination of moving the media along one axis while moving the pen along the other gives the pen the same ability to cover the entire media surface that flatbed plotters have.

While large drum plotters that work this way are still being made and used, variations on this concept have more or less replaced the old "pure" drum designs. Among the plotters reviewed here, only the small Strobe M260 still works as a classic drum plotter.

Much more common is a modified drum design in which the media still moves in relation to the pen head, but forward and backward over a flat plane. The media is anchored on both sides to control



Selecting the Editor's Choices for plotters was like separating the wheat from the chaff when there isn't much chaff. It wasn't easy; even the slowest and least accurate plotters reviewed here can create a plot that might please many.

The top three choices are based on straight performance, and, it so happened that they are the three most expensive plotters.

Hewlett-Packard's HP 7550A is quiet, attractive, and fairly priced. It has a significantly higher pen speed than its predecessor, a seemingly jam-proof sheet feeder mechanism, and gobs of intelligence.

Nicolet's Zeta 8 is, if anything, even more rugged. It's the most expensive plotter tested, but once you observe the pen speed and the incredibly fast paper flow, you won't feel it's overpriced. Zeta 8's pure throughput is something to behold; it's a fortunate PC indeed that connects up with this heavyweight.

Houston Instrument's DMP-51/52 continues the DMP-41's tradition of relatively economical D-size plotters, but the new DMP-51/52 is light-years ahead of

the slow 41 series in speed and control. Its liquid-ink plots on vellum are magnificent—accurate, saturated, indeed, everything one could want.

Hewlett-Packard's HP 7475A and its IBM counterpart, the IBM 7372, are the plotters of choice in the middle price range. While the 7475A is not the fastest plotter around, the quality of its plots is superb, fully the equal of the more expensive HP 7550A. Even though this plotter has been around for a while, its design is so advanced that it still stands up well today. And Hewlett-Packard itself is quite something when it comes to plotters. This company spends more effort researching the inks for the pens than others spend designing their plotters.

The Epson HI-80 is the final choice. It makes a name for itself at the low end of the price scale and the top of the performance scale. It is superfast, but not because its engineers had the luxury of pouring money into expensive motors and other devices. Epson's hardware math and customized microprocessors get the job done with finesse rather than brute force. The HI-80 handles only A-size media but, more likely than not, will come in a B-size version shortly. ■



Contributing editor Glenn Hart: "I've had plotters on the brain (and ink on my fingers) for well over a month now. There's something magical and mysterious about them; watching a brightly colored image take shape excites both computer expert and layman alike."

the fore and aft movement and to prevent slippage. Although many companies that manufacture such units continue to refer to them as drum plotters, the term *roller bed* is more descriptive of the way these devices actually work.

Media Hold-Down

No matter what techniques are used to move the pen head, any unwanted movement of the media in relation to the pen head destroys the precision of the final image. With flatbed designs, the media must

not only be absolutely fixed in place, but also completely flat. If any part of the media is raised above the bed, the pen may graze it as it passes and leave a disfiguring mark.

The flatbed plotters tested here use a va-

KeyChart

This presentation graphics package drove all 24 plotters.

PC Magazine Labs selected *KeyChart*, a comprehensive presentation graphics package from SoftKey Software Products Inc., as the standard for this plotter project because the program already supported most of the plotters we planned to test and because its authors at SoftKey kindly offered to write new drivers for any plotters not yet supported. As it turned out, we did have to take advantage of this offer in a couple of cases.

KeyChart can produce a wide variety of chart types including bar, clustered bar, stacked bar, horizontal bar, line, pie, x-y, and scatter, as well as high-low and volume stock charts. A very flexible text-chart system makes attractive text-only charts. You can preview the charts on the screen or output them to an unusually large number of different plotters.

Interactive Previewing

The screen preview function can be considered *KeyChart*'s main claim to fame. Besides showing what the plot will look like, either in position on the output page or full size, the chart can be changed interactively while displayed on the screen. Chart elements like legends, titles, floating blocks of text, chart size, location, and orientation can all be modified. This system makes fitting multiple charts on a single page easier and much more flexible.

The screen preview function is a great productivity aid and a wonderful convenience. Plotting is a time-consuming process even on the faster plotters reviewed here, and previewing the chart elements on the screen before printing can really speed things up.

KeyChart uses a menu-driven, fill-in-

the-blank form approach to data entry and chart specification. The forms are cleanly structured and easy to use. You can enter data from the keyboard or import it from external spreadsheet programs like *1-2-3* or *Symphony* with an interesting, entry-by-entry procedure. The program maintains a catalog of charts, which allows longer filenames and makes it easier to select and manipulate the charts. *KeyChart* also offers unusually flexible control over text fonts and positioning.

All measurements throughout the system are in millimeters, which may disconcert the average American user for a while. Dual-axis charts are very easy to create, and *KeyChart* is one of the few business presentation packages that can also do a creditable job on scientific graphs. The system that produces text-only charts uses files created with any word processor or editor. Commands for orientation, drawing boxes and lines (as in organization charts), character slant, and several others are embedded in the text, then processed by *KeyChart*.

Most graphics packages produce plotter output with either software-generated type fonts or the plotter's own internal ROM fonts. *KeyChart* is unusual in allowing both approaches. The program also supports a good cross-section of dot matrix, ink jet, and even thermal transfer printers in addition to all the plotters reviewed here.

Another unusual feature is true batch processing. This feature allows a list of predefined charts, multiple copies of a chart, or any combination of charts to be plotted unattended on plotters that have some form of automatic media feed, such as the HP 7550A, Nicolet Zeta 8, and

others. The *KeyChart* method is flexible and works well.

Read All About It

KeyChart's documentation is extensive, detailed, and very well written. The section on how to interface plotters, which gives exact switch settings and cable configurations, was a tremendous help in this project. The manual, incidentally, was entirely "typeset" on a plotter through the use of *KeyChart*'s text-chart provisions.

As with any other program, there are some things I would like to see added. Support for Hercules and compatible monochrome graphics boards, Gantt charts, a choice between inches and millimeters (although I wonder how much longer we can resist metrification), user-adjustable hatch spacing to accommodate different pen widths, and a few other minor changes would be welcome.

The fact that *KeyChart* is bundled with some plotters should be considered a real plus for those units. *KeyChart*, unlike some bundled software that conveys the feeling that free is about what the software is worth, is more than good enough to serve as the primary business graphics software for even a serious user.

—Glenn Hart



KeyChart

SoftKey Software Products Inc.
260 Richmond St. W. #404
Toronto, Ontario
Canada M5V 1W5
(416) 530-1931
List Price: \$375

Requires: 128K RAM, one disk drive, color/graphics card.

CIRCLE 676 ON READER SERVICE CARD

PLOTTERS

riety of techniques for holding the media firmly in place. If the bed is metallic, strips of magnetic material placed around the outside of the media hold it in place, though sometimes mechanical hinges placed on one of the other edges help to stabilize it further. Other types of flatbed plotters have the media adhere to strips of sticky material set into the surface of the bed. However, although both methods work, it is still sometimes difficult to lay the media absolutely flat across the entire surface of the bed. Moreover, in the latter case, the sticky tapes can attract dirt and eventually lose their stickiness.

The best hold-down method currently in use for flatbed plotters is electrostatic attraction. In this system, a static charge that attracts the media is built up on the plotter bed, causing the media to cling to it much the way that a balloon can be made to cling to a wool sweater. A simple switch turns the electrostatic charge on or off, and you can flatten the media out simply by smoothing it with your hand.

The task of holding down media is even more critical and difficult in roller bed plotters, where media moving at a high speed must maintain an accuracy of thousandths of an inch. A plotter has two main ways it can grasp the media at its edges to control this movement.

Most roller bed plotters use a pinch-wheel technique in which the edge of the media is squeezed between two wheels. Often one of the wheels is made of hard plastic or rubber, similar to the pinch wheel of a tape deck that holds the audio tape against the capstan. The other wheel is sometimes coated with a gritty substance in order to gain traction. The grit on these wheels can leave minute and usually invisible holes in the media. Some designs use a heavily serrated metal wheel, or even a wheel with small spikes that penetrate the media for a stronger grip. Very large plotters using pinch-wheel methods often add another hold-down method, such as a vacuum, to ensure flatness in the immediate area of the pen head.

The other roller-bed method, based on techniques familiar to anyone who has ever used a printer tractor, uses media with sprocket holes that mate with protrusions on the plotter. Like bidirectional tractors on printers, this mechanism performs the

fore and aft movement required. One advantage it gives is that continuous fanfold or roll paper can be used for batch, or continuous, plotting, assuming that the software driving the plotter is capable of handling this kind of task.

Drum plotters anchor their media at both ends by fitting them under some form of clamps. Assuming that the media is stretched tightly around the drum, flatness is very good.

Software

Plotters are, in many respects, more dependent on software than almost any other peripheral. Connect a printer, send output

Plotters are more dependent on software than almost any other peripheral. Connect a printer, send output to it, and chances are it will print. A plotter, however, needs much more instruction than standard computer output includes to do much of anything.

to it, and chances are it will print. A plotter, however, needs much more instruction than standard computer output includes to do much of anything.

To meet the need for instruction, plotters have built-in graphics command languages stored in ROM. These languages—whether HPGL, DMPL, or one of the less common proprietary languages—take much of the burden off the program attempting to create the plotted output. Even complex commercial programs instruct plotters in the high-level plotter language rather than in absolute plotter movement instructions.

BASIC or other high-level programming languages can be used to send the stream of commands to the plotter. Some plotter manuals include sample programs in BASIC for either test or demonstration

purposes. Unfortunately, only a very experienced programmer can realistically consider doing any serious work directly in the plotter language. Anyone else will quickly tire of the mathematics and geometry that is required, or will be daunted by the process of figuring out the extensive stream of plotter commands needed. Therefore, most users will have to settle for commercial graphics software such as CAD programs, integrated software, spreadsheets or presentation graphics programs to drive their plotters. (PC Magazine Labs used *KeyChart* to drive each of the plotters reviewed; see the accompanying sidebar, "KeyChart.")

Built-in Drivers

Business users sometimes attempt to drive plotters with the graphics segments of one of the integrated packages or spreadsheets like *Symphony*, *Framework*, *1-2-3*, *SuperCalc*, and others that include built-in plotter drivers. Most such programs contain drivers for HPGL-compatible plotters, and that's it. Though these programs can draw reasonably attractive plots, most have little or no provision for moving legends or other chart elements around, modifying them, superimposing charts, or performing all the other manipulations that add visual appeal.

To achieve full flexibility, a dedicated graphics software package is desirable. PC Magazine Labs tested more than 30 business presentation graphics packages (see Volume 4 Number 11). These programs vary in their ability to create different types of charts, their user interface style, the amount of movement the elements of a chart are allowed, the number of type fonts they can use, the data formats they recognize, and many other aspects. The better packages, which are very flexible, can produce a wide variety of impressive graphics output. Most such programs can drive a large number of plotters, but, as always, prospective buyers should make sure that their hardware and software are able to coexist happily. ■

Glenn Hart is president of his own computer consulting firm, Glenn A. Hart Associates, located in Monsey, New York. His specialties include business graphics and CAD systems.

Testing Methodology

Testing a collection of plotters might seem reasonably straightforward, but, as often happens in comparative testing, this turned out not to be the case. Consequently, the approach I chose necessitated a series of interesting decisions.

Using the same software to drive each plotter was an obvious choice. SoftKey provided *KeyChart*, its presentation graphics software, and its invaluable support. I designed charts that would exercise the capabilities of the plotters and make normal but demanding plots. Since *KeyChart* can use either a plotter's internal ROM font or fancy, multistroke fonts generated in software, I timed both. The occasional user probably will prefer the more complex fonts that the software can generate, but the speed gained by using the fonts incorporated in ROM is significant to business users who may have to plot many charts in a short time.

Equally importantly, the ROM fonts allow a plotter to operate at its full speed capacity with little or no influence from

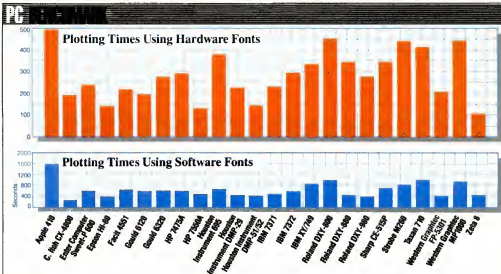
the vagaries of the computer/plotter communications interface. Each character in a software font may require 10, 20, or even more very short pen strokes, so the rate at which the much greater number of commands required is fed to the plotter is also important.

The serial baud rate would seem to be a significant factor, but actually, for the most part it doesn't matter. Most plotters are so much slower than the communications channel that it is rarely, if ever, necessary for the plotter to wait for information from the computer. However, a few of the very fastest high-end plotters, like the HP 7550A, Nicolet's Zeta 8, and Houston Instrument's DMP-51/52 benefit from faster baud rates, especially on the software fonts.

When it came to evaluating the baud rate, I had to choose between two approaches: Either a common baud rate could be used to make the benchmark timings comparable, or each plotter could be optimized to its maximum usable baud rate. I chose the first method

for the reason outlined above: The effect on most plotters would be minimal, and this procedure obviously improves comparability. Tests of the HP 7475A, for example, showed a difference of only a few seconds between the 2400-baud rate used in the tests and the full 9600-baud rate that the plotter can manage. With the faster HP 7550A, the difference between 2400 and 9600 was only 5 percent or so with the ROM font charts, but fully 50 percent with the software font charts. I discovered a similar effect when comparing the parallel and serial interfaces on plotters equipped with both. Thus the speed of the ROM timings is likely to be fair. Obviously, you would normally turn up your plotter to full communication speed in the real world.

The same computer system—an IBM PC with 640K and a 20-megabyte Bernoulli Box—drove each plotter. The speed of hard disk access can also affect the software font benchmark. Therefore, the times shown are relative, not absolute.—Glenn Hart



PLOTTERS

Sharp CE-515P

Several years ago I reviewed a handheld computer, manufactured by Sharp, that offered a cute little miniplotter peripheral capable of producing four-color graphics. This miniplotter could plot characters in several different sizes and served as the pocket computer's printer as well.

Sharp now offers essentially similar technology in its CE-515P plotter printer. This diminutive device is the lightest plotter in this project. Sheet paper up to normal A-size can be fed into the plotter, and you can use 4½-inch-wide roll paper as well. The minimal controls on the operator panel feed or retract the paper, slowly at first and then faster if you hold the button down for more than a second or so.

You insert four tiny bulletlike pens into a rotating turret that acts as the pen head and moves horizontally while the paper is moved vertically by a standard pinch-wheel mechanism. The final button on the operator panel rotates the turret for pen insertion or removal, and the turret accepts pens for both paper and film. There is no capping mechanism, and you must go through a delicate and cumbersome pen-removal process at the end of a plotting or printing session.

The CE-515P comes equipped with both serial and parallel interfaces, a welcome feature in such a low-cost unit. The RS-232 interface is rather primitive, though, and can only operate at speeds of 1200 baud or slower. A nonstandard DIN-type connector is used, but Sharp included an IBM-compatible cable that worked without fuss. The parallel connector is of the standard Centronics variety.

The CE-515P's step size is several times less precise than the other plotters reviewed. The result was very noticeable on



Sharp CE-515P

the software-generated text chart, but in general the plots were sharp, and cross-hatching very accurate. The internal text font is singularly unattractive; lowercase letters don't have the normal descenders, for example. Also, the paper movement system put small holes in the edges of the paper.

Speed is not the Sharp CE-515P's forte, but this little plotter performs surprisingly well, all things considered. A more complex graphic design than our benchmark charts, especially one with better area fill, would be difficult to execute. The parallel interface is quite a bit faster than the primitive serial interface, so it should be used where possible.

The CE-515P looks and feels a little like a toy compared with most of the other plotters evaluated, even though its plots are accurate and sharp. The manual includes instructions for connecting the plotter to Sharp's handheld and portable computers, and this arena is clearly much more where the device belongs. It is light and small enough to be portable if appropriately protected, and the CE-515P might not be too bad for such use. On the other hand, anyone at all serious about plotting should try and save for one of the more serious low-end plotters.

Strobe M260

The first plotter I ever owned was a Strobe Model 100, a tiny but surprisingly capable drum plotter. While not the fastest plotter ever designed, the little single-pen 100 was extremely accurate. It used standard Pilot pens, which can be purchased at any stationery store (although it was no picnic to force-thread them into the pen head). All in all, the Strobe 100 gave me a great deal of pleasure.

Thus I unpacked the Strobe M260, a multiple-pen descendent of the earlier model, with a sense of welcome. The rotating pen head houses eight strange little pens with their fiber tips on the side of the barrel. No capping is possible with this design, but you can fit a sponge collar around the entire mechanism to prevent drying.

PC FACT FILE

M260
Mission Peak Systems
3514 Arden Rd.
Hayward, CA 94545
(415) 887-0756
List Price: \$595

CIRCLE 687 ON READER SERVICE CARD

PC FACT FILE

CE-515P
Sharp Electronics Corp.
Systems Division
10 Sharp Plaza
Paramus, NJ 07652
(201) 265-5600
List Price: \$399

CIRCLE 689 ON READER SERVICE CARD

Since this collar tends to get wet with ink, the M260 was the only plotter I tested that consistently made my hands look like a rainbow.

Two spring-loaded clamps hold paper onto the rotating drum. The M260's clamping system is much better than the old Model 100's, but it is still hardly a paragon of convenience, and you can use only the standard A-size paper.

Strobe bills its RS-232 interface as "intelligent," and the only adjustments available are baud rate and parity. Cabling is likewise straightforward, so installation is simple. Strobe includes a three-disk package of IBM-compatible software with the M260. In addition to a disk of attractive demo plots, several programs produce normal bar, line, and pie charts, organization charts, and an unusually flexible array of text charts. None of the software is really first rate, but all is workable enough for noncritical needs. However, the documentation for both the software and the hardware is barely adequate.

Unfortunately, I had trouble testing the M260. The hardware handshaking that our KeyChart test software needed was defective (although the plotter worked with Autodesk's AutoCAD and other programs that used only software handshaking protocols), and text blocks in the benchmark

plots were also very uneven. A replacement plotter performed handshaking correctly but would not change pens and did not raise and lower the pen head correctly; smeared plots were the result. Speed was nothing to write home about either, and clarity and accuracy were mediocre. A third sample performed very nicely, however, with good accuracy and even printing. Rating the M260 is therefore difficult; my subjective evaluation is sort of a mental average of the three samples.

As this review was being written, we learned that Strobe has gone out of business. A company called Mission Peak Sys-

*The Strobe M260's speed
was nothing to write home
about, and clarity and
accuracy were mediocre.*

tems will be supporting the some 10,000 existing owners of Strobe equipment, as well as selling off existing inventories. The price of new units has been drastically reduced. But, even at this lower price, I don't think the M260 is a particularly good bet. ■

C. Itoh CX-4800

Like Sharp's CE-515P, the C. Itoh CX-4800 uses a rotating turret as its pen head. The CX-4800 looks much more like a low-end dot matrix printer than a plotter, and, in fact, moves paper just as printers do, with a friction platen or tractor feed. The unit is built reasonably well and is surprisingly heavy for its size, but some aspects of its construction do not inspire confidence. The pen carousel and pen head mechanism appear to be particularly fragile.

The rotating carousel holds four fiber-tip pens. No capping mechanism is possible with this design. However, its storage well for the carousel at least lets you avoid removing and inserting the pens each time you use the plotter. The pen points are extremely fine and give sharp, but light, results.

The CX-4800's sprocket feed works well enough with typical fanfold computer paper, but single-sheet handling is poor. The plotter could not handle the thicker plotter paper I used for my tests at all, and even normal 20-pound copier bond paper usually misfed. The plotter holds paper with pressure friction wheels, so any slippage is nearly fatal.

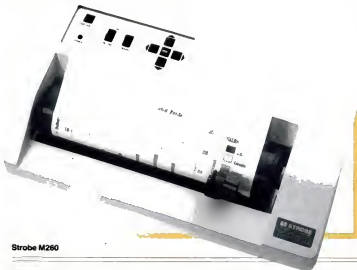
The CX-4800 uses only a proprietary graphics language. Some commercial graphics packages, including Autodesk's AutoCAD, support this command set. (Of course, if you're going to spend \$2,500 for a CAD package why would you buy an expensive plotter like the CX-4800?)

Documentation is weak and is obviously translated from the Japanese. For example, "Efficient" and "Non Efficient" are used in a chart to indicate whether specific options are active or not. There's lots of information, including a complete explanation of the control codes, but most of the data would not be decipherable by the nov-



CX-4800
C. Itoh Digital Products Inc.
19750 S. Vermont Ave., Suite 220
Torrance, CA 90502
(213) 306-6700
List Price: \$599

CIRCLE 699 ON READER SERVICE CARD



PLOTTERS



C. Itoh CX-4800

ices who are the obvious target for this machine.

The little CX-4800's biggest surprise was its high speed. Only a few plotters worked faster than the CX-4800 on the ROM font test, and it was the fastest plotter of all on the software text benchmark. Its plot quality was reasonably good, although the diagonals had a somewhat jagged appearance and the internal ROM font was neither particularly attractive nor well drawn.

The CX-4800 is not a very appealing plotter overall—considering its paper handling problems, light color saturation, and mediocre resolution—but it sure is fast! ■

Epson HI-80

Epson makes dot matrix printers, right? Well, sure, but now it's making and marketing line extensions like daisy wheel printers and plotters, too. If its new HI-80 plotter is any indication, Epson will do just as well in these new product ventures as it has with its traditional dot matrix printers.

The HI-80 looks like a small printer,

but it is, in fact, a roller bed plotter capable of handling A-size paper or transparencies. Construction quality is very good for its size; the HI-80 feels solid and tight. A straight-line pen carriage that attaches to a moving printhead stores up to four small pens. When not plotting, the printhead

The Epson HI-80 was the fourth fastest plotter on the ROM font test—right behind the three most expensive plotters tested.

parks over a docking area with four rubber grommets that cap the pens to prevent drying—a clever and effective method. Epson offers three types of pen-and-ink combinations: both water- and oil-based fiber-tip, and water-based ballpoint, all available in ten colors. The pens are small and don't look like they hold very much ink, but the Epson name gives some confidence that replacements should be readily available.

The HI-80 recognizes three distinct command sets. In addition to using a pro-

prietary graphics language of its own, the plotter can emulate a Western Graphtec 4675. This emulation is a strange choice, since there isn't all that much more software for the Western Graphtec machine than for a new unit like the little Epson. Fortunately, a third-party manufacturer has designed a plug-in board that adds HPGL compatibility, as well as a serial interface. The HI-80 can also act like an Epson RX-80. The emulation is very complete, lacking only the bit-image graphics capabilities (a fiber-tip pen wouldn't last very long dotting out 40 or 50 thousand points per square inch). Setting up the Epson was completely foolproof: Plug in a normal Centronics cable and off you go.

The documentation is typical Epson: copiously illustrated, clearly written, and easy to understand. Performance was shockingly fast. The HI-80 was the fourth fastest plotter on the ROM font test—right behind the three most expensive plotters tested and ahead of many much more costly units. It was, relatively, even faster on the software font benchmark, finishing second. The specifications for the unit are good, but *not that* good. Epson claims that an optimized microprocessor and mathematics circuitry built into the hardware deserve the credit.

Plotters have to perform a lot of floating-point math, and the Epson has the hardware to do it faster. Accuracy, straightness of lines, internal font quality, and the other performance factors also range from very good to excellent. In addition, I tested the HI-80 as a printer, using its RX-80 emulation. Even a complex *WordStar* document printed correctly, once the lines were shortened to reflect the larger character size "printed" by the HI-80. Boldface, underlining, double-strike, subscript and superscript, and other *WordStar* special effects executed properly. The HI-80 won't match even a slow printer for throughput, but the RX-80 emulation

PC FACT FILE

HI-80 Plotter/Printer
Epson America Inc.
2780 Lomita Blvd.
Torrance, CA 90505
(213) 539-9140
List Price: \$599

CIRCLE 698 ON READER SERVICE CARD

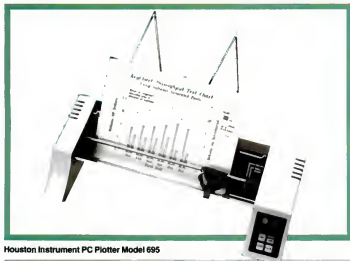
might be handy for text charts.

I also installed the optional HPGL-serial card. The installation is a snap, and it worked correctly the first time. The card slowed down the software font plotting, but for some reason the ROM font benchmark was hardly bothered at all, even with the change from parallel to serial interfacing. If you gather that I like the HI-80,

you're right. Epson will be offering the HPGL card to dealers on a promotion that allows them to sell the HI-80 with the card for the same list price, at least for a while. In any case, if an A-size plotter is sufficient for your needs, the Epson HI-80 is worth very close scrutiny. Let's hope that Epson does well enough with this first entry to make larger plotters, too. ■



Epson HI-80



Houston Instrument PC Plotter Model 695

Houston Instrument PC Plotter Model 695

Houston Instrument's PC Plotter Model 695 is the lowest-cost plotter I tested that is capable of producing B-size, 11-by-17 plots.

This is the main, and, for the most part, only claim to fame of this somewhat odd unit.

The 695 uses grit-wheel, roller-bed paper movement, and its paper loading is probably the unit's best feature. You simply lean the paper on the paper support bail and it comes to rest on the grit wheels. Press a Load button, and the plotter takes over from there. The process is easy, fast, and convenient.

A rotating turret that moves to perform the plotting holds four fiber-tip pens. The unused pens are not automatically capped during plotting sessions. It appears that Houston Instrument offers only this one type of pen, a limitation that drastically reduces the unit's flexibility.

Interfacing the 695 is complicated by its use of a six-wire modular, phone-type plug for the RS-232 line. Although Houston Instrument sells cables with normal serial connectors on the other end, I built my own before finding such a cable in another carton of test samples. The building process was tedious; let's hope that modular cables don't catch on.

Construction quality is fair. This plotter is far from being a toy, but it does not feel like it would stand up to moderate or heavy use. The power supply is housed externally in a black box that you plug into a wall switch. The manual says that there is no on/off switch, but an unexplained toggle switch on the rear panel labeled "I-O" seems to do the job.

The programming language is Houston Instrument's standard DMPL, at one time

PC FACT FILE

PC Plotter Model 695

Houston Instrument
8500 Cameron Rd.
Austin, TX 78753
(800) 531-5205

List Price: \$799

CIRCLE 694 ON READER SERVICE CARD

PLOTTERS

the alternative to HPGL but now fading somewhat. The 695 supports only a subset of the total language, but several graphics packages seemed to drive it correctly. DMPL is explained very well in a separate manual supplied with the 695; a decent operating manual and a list of compatible software comes with it.

Performance was fair to good. While hardly a speed demon, the 695's benchmark times were respectable. Paper movement and pen speed are not as bad as the numbers would indicate; the times are slowed by the leisurely pen-change process. The 695's plots were reasonably clean, but their somewhat wavy diagonal lines and general lack of precision might not be acceptable to some users. The internal ROM text font was not particularly attractive. The most annoying aspect of the tests was the clatter—a tinny and clackety pounding combined with a whining sound that is distinctly unpleasant.

While the 695 can produce decent plots, you can buy plotters that are faster and more accurate for the money. However, if you need B-size plots and don't want to spend much, the 695 isn't bad. ■

Roland DXY-800

The Roland DXY-800 is a flatbed, B-size, eight-pen plotter priced below \$1,000. This is an unusual combination, so I was curious to see how it performed. Roland used an unusual amount of metal in the plotter. It is not always clear that metal offers advantages in many applications (especially thin sheet metal as used here, compared to thick plastic), but the DXY-800 feels solid and looks good. A wire stand allows the plotter to work at a 60-degree angle, thereby reducing its footprint. The plotter holds



Roland DXY-800

down the paper with a hinged metal plate and two soft magnetic strips that adhere to the metal bed.

Up to eight pens can be stored. No capping mechanism is used, but holes adjacent to the pen area store and seal the pens between uses. The clearance from the bottom of the pens to the bed (and any media on it) is very small, so inserting the pens often leads to marking the bed or media.

The DXY-800 has both serial and parallel interfaces, and the serial cable is uncomplicated. Interfacing was simple and uneventful. No HPGL or other emulation is available, and the DXY-800 uses only its own proprietary graphics language. The language is explained reasonably well in the skimpy documentation and some examples are provided, but overall the manual leaves much to be desired. The operator panel has only two buttons.

The DXY-800's performance was fair to good. Plotting was slower than that of some competitive units, although the accuracy of the plots was very good. You must manually set the pen station to the lower-left corner as the origin when the plotter is powered up; if you don't, the penhead does not grab the pens at all or they may go flying off the plotter. The internal text font was unusually attractive and would proba-

bly be acceptable for normal presentation use—a good thing, given the slowness of software font plotting.

Because of the small pen clearance, it was very easy to disfigure the plots when removing the paper. Paper insertion was a bit chancy for the same reason. It was also easy to leave slight, uneven, high spots on the paper, which often ruined the plot. This was especially true when I used the plotter in the tilted position.

The Roland DXY-800 failed to excite. Some aspects of the unit's performance were pleasant, but it has some very good competitors in the same price range. ■

Apple 410

Apple's 410 is a B-size roller-bed plotter styled to match the Apple ImageWriter printer. The similarity is sufficient to impart a degree of familiarity and comfort to users of the Apple family, but the 410 works with IBM and other computers too.

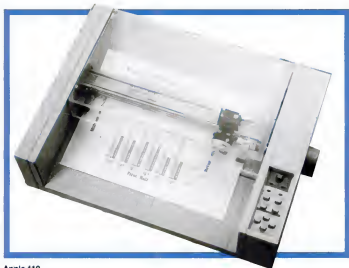
The 410 uses a rotating pen head that holds four peculiar little push-in pens that don't look like they hold much ink. The

PC FACT FILE

DXY-800

Roland DG
7200 Dominion Circle
Los Angeles, CA 90040
(213) 685-5141
List Price: \$895

CIRCLE 690 ON READER SERVICE CARD



Apple 410



Gould Colorwriter 6120

pen tips protrude from the side of the pens, precluding automatic capping. However, Apple does supply an external capping receptacle that the pen head fits into. The fiber-tip pens, available in eight colors, come in both 0.3- and 0.7-mm tip widths and use both oil- and water-based inks.

Pinch wheels grip the media on two

edges, as on most roller-bed plotters. The right wheel slides along a rail over a wide range, up to B size. The media is easy to insert, but you must turn a platenlike wheel on the right side of the plotter by hand until the media is lined up with a mark. This system is not terribly inconvenient, but it is far from the smoothest available.

PC FACT FILE

Model 410

Apple Computer Inc.
10260 Bandy Dr., Suite 1M
Cupertino, CA 95014
(408) 973-3140
List Price: \$995

CIRCLE 700 ON READER SERVICE CARD

The operator panel is reasonably complete and has an acceptable feel. The documentation is up to Apple's usual high standards. The 410 has its own proprietary command set, which offers acceptable flexibility but is no match for—nor is compatible with—HPGL.

Although the design of the 410 may be unexceptional, its performance is exceptional—exceptionally *slow*. The 410 was by far the slowest plotter tested in both the ROM font and the software font benchmark. Its glacial plotting speed is totally unacceptable for serious business use. The plots themselves were not bad but looked slightly grainy. Diagonal lines were straight, which they should be at these plotting speeds. The plotter was somewhat noisy, and the ROM font was acceptable.

I generally like Apple products but not the Apple 410. Its sluggish performance is simply not competitive. ■

Gould Colorwriter 6120

The Gould Colorwriter 6120 is yet another HPGL-compatible B-size plotter purporting to offer many of the features of the HP 7475A at a lower price.

The unusual thing is that it actually does evoke the 7475A in many ways.

My initial impressions were quite favorable. Although the unit is physically small and not particularly heavy, it seems solid. It has both parallel and serial interfaces and its cabling is standard and straightforward. The only unusual switch controls the plotter's "reduction" mode, which reduces plots—using standard HPGL commands—to fit the plotter's somewhat different scaling. The machine came with a copious supply of various pa-

PLOTTERS

per and transparency material and an IBM-compatible serial cable that worked the first time.

The 6120 uses slim and elegant metallic pens in both fiber tip and superfine ceramic tips. The pens slip easily into holes set in a straight line on the seven-pen head; all the pens move with the head as the plotting proceeds. A relay-actuated pusher moves over the pens and presses the selected one down onto the media.

The operator panel is in the middle of the pack; it has more controls than some plotters but less than those of others. Pen movement and other standard controls are available, so most normal requirements are covered.

The plots produced by the Colorwriter 6120 were extremely sharp and accurate, especially with the fine-tip ceramic pens. Noise level was a bit above average, but not obnoxious. Speed was also above average, especially on the ROM font benchmark. The internal ROM text font was acceptable, but barely so.

If there was anything out of the ordinary at all, it was the 6120's reduction mode. Without this special setting, the normal benchmark plots would not fit on the page; the plotter clipped the edges, lit its error light, then proceeded to finish whatever plot elements fit. With the reduction feature turned on, the plots were perfect, but everything was, as advertised, smaller. The x-axis of our benchmark, for example, was reduced by about 10 to 15 percent, a significant reduction. This behavior is somewhat strange, but it really doesn't create any special problem unless drawings must be made to exact scale.

The 6120 impressed me as capable. While I wouldn't put it (or any similarly priced plotter) in a heavy-use CAD application, it is definitely capable of standing up to moderate business use. Its compact size and reasonable price should appeal equally to advanced home users. ■

PC FILE

Colorwriter 6120
Gould Inc.
3631 Perkins Ave.
Cleveland, OH 44114
(216) 361-3315
List Price: \$995

CIRCLE 665 ON READER SERVICE CARD



Taxan 710

Taxan 710

The Taxan 710 is yet another low-end, B-size flatbed plotter. And while it wasn't the slowest plotter tested, its times belong in the bottom group.

This plotter has six pens held in a row of brackets. It has no capping mechanism, but at least there are convenient receptacles adjacent to the pen stalls for storing each pen. Taxan offers water- and oil-based fiber-tip pens, and sells an adapter that allows you to use Pentel Ceramicon ceramic-tip pens.

To hold down the media, the machine uses a mechanical latch on the left side of the plot bed, which has magnets underneath and a flexible magnetic strip positioned on one edge of the media. As with other, similar systems, it can be difficult to get the media perfectly flat, and the flexible strip can move if the pen head comes too close.

It's easy enough to operate the 710 from its front panel, which uses attractive membrane switches for pen selection and manual pen movements, but it doesn't offer some of the controls commonly included on the better control panels. Its serial interface is quite standard, however; I had no

problem connecting the plotter.

The Taxan documentation is simply terrible: Not only is it very poorly translated from the Japanese, but it leaves out some useful information as well. U.S. companies are often criticized for not customizing their products for export, but manuals like this show that this country doesn't have a monopoly on this laxity. Curiously, there is no mention of Taxan anywhere in the manual, or even on the outer shipping carton. Perhaps Taxan itself will prepare a better manual at some point.

Although the manual contains no such indication, the 710 seems to use the HPGL command set (at least the *KeyChart* configuration for the 7475A worked). Taxan should make sure that the documentation tells buyers that the plotter uses HPGL; otherwise many will not realize they have access to the tremendous body of software available for this graphics language.

PC FILE

Taxan 710
Taxan Corp.
18005 Courtney Ct.
City of Industry, CA 91748
(818) 810-1291
List Price: \$995

CIRCLE 666 ON READER SERVICE CARD

The 710 produces a variable-pitch whine-and-swish noise as the pen head moves around the bed. This serenade is somewhat annoying. Probably more annoying, though, are the 710's less-than-speedy plot times. And in spite of its slow plotting speed, the machine exhibited distinct wavering in some diagonal lines. On the other hand, the plots looked good overall, and the HPGL emulation seemed to work correctly.

Taxan has built a reputation as a supplier of good-quality color and monochrome monitors, but the 710 will not particularly add to the luster of the company's image. Something must be done about the documentation, and the performance is nothing to write home about, either. ■

Facit 4551

Clearly modeled on the popular Hewlett-Packard 7475A in many respects, the Facit 4551 offers very good performance, some interesting engineering ideas, and good quality construction at a significant savings in cost. The 4551, like the HP 7475A, accommodates both A- and B-size paper. Fa-

cit also offers its model 4550, an A-size-only equivalent.

Overall construction is quite good, especially considering the price. Three types of pens are available: ball point, ceramic tip, and fiber tip, all of which come in 8 to 12 colors and in broad and fine tip widths. This selection is unusually flexible, which is important given the unique shape of the pens and the small likelihood of third-party availability.

Six-pen cassettes that attach to the moving pen head for plotting store the pens. Relays in the head push the backs of the pens (which are accessible in the cassette) down to media level as needed. Two receptacles store the loaded cassettes to prevent drying, but there is no automatic capping of unused pens during a plotting session. HPGL is the native language; the 4551 has no proprietary command set.

Facit's 4551 has both a Centronics parallel and an RS-232 serial interface. The serial interface may require some rather unusual connections, which might cause problems on computers that do not implement the necessary lines. At the least, you might need a special cable; if you do, the details are spelled out in an excellent technical manual. The documentation also includes an operator guide and a superbly clear programming manual explaining

HPGL in great detail.

The operator panel has fewer buttons than some competitive units, but each button does double duty to provide a reasonably complete set of functions.

Putting the Facit 4551 through its paces was straightforward once I constructed the correct interface cable. The HP 7475A influence was quite noticeable in the method of loading media, and the plotter behaved

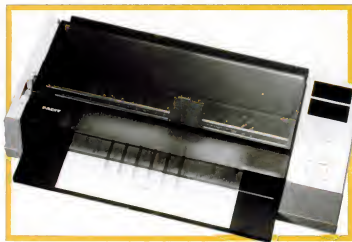
Clearly modeled on the HP 7475A, the Facit 4551 offers good performance, some interesting engineering ideas, and good quality construction at a significant savings in cost.

like an HP clone in several other ways.

The pen cassette system eliminates the necessity to move to a carousel to retrieve the next pen. The relays that activate pen motion are rather noisy in a metallic "rat-a-tat-tat" sort of way, but it's not all that obtrusive.

The PC Magazine Labs' test plots were sharp and clean, although some diagonal lines were very slightly wavy. The two samples tested both had this minor deficiency; so it's probably a function of the design. However, the unit's ballpoint pens obviously contributed to the overall excellent quality. The internal ROM font was more attractive than many and would be usable in most business situations.

The Facit 4551 is one of the lowest priced plotters available that can print on 11- by 17-inch paper. Its HPGL emulation worked fine, and it produced good quality plots. Not a bad combination! ■



Facit 4551

Model 4551

Facit Inc.
9 Executive Park Dr.
Merrimack, NH 03054
(603) 424-8000
List Price: \$995

CIRCLE 696 ON READER SERVICE CARD

PLOTTERS

24 Plotters: How They Compare

24 Plotters: How They Compare	Physical Specifications													Interface		Programming				
	Paper movement	Maximum paper size (ANSI)	Paper-hold system	Number of pens	Pens auto-capped	Maximum pen speed (inches/sec.)	Pen speed adjustable	Sheet size (inches)	Accuracy	Buffer size	Act as digitizer	Auto paper feed	Weight (pounds)	List price	Serial	Parallel	IEEE	HPGL	Proprietary	Other
Sharp CE-515P	Roller bed	A	Pinch wheel	4	No	N/A	No	0.008	N/A	N/A	No	Yes	31	\$399	Std.	Std.	N/A	No	Yes	No
Apple 410	Roller bed	B	Pinch wheel	4	No	3.9	Yes	0.004	± 1%	256 bytes	No	No	13.2	\$495	Std.	N/A	N/A	No	Yes	No
Strobe M260	Drum	A	Spring clamps	8	No	3	No	0.002	N/A	512 bytes	Yes	No	11.5	\$595	Std.	N/A	N/A	No	Yes	No
C. Itoh CX-4800	Roller bed	A	Tractor/platen	4	No	4.7	No	0.004	± 1%	N/A	No	Yes	14.4	\$599	Std.	Std.	N/A	No	Yes	No
Epson America HI-80	Roller bed	A	Pinch wheel	4	Yes	9	Yes	0.004	N/A	0	No	No	9.9	\$599	Opt.	Std.	N/A	Opt.	Yes	Graph- tec
Houston Instrument 695	Roller bed	B	Grit wheel	4	No	4.2	Yes	0.001	N/A	256 bytes	No	No	6.5	\$799	Std.	N/A	N/A	No	Yes	No
Roland DXY-800	Flatbed	B	Magnetic	8	No	71	Yes	0.004	± 1%	0	No	No	9	\$895	Std.	Std.	N/A	No	Yes	No
Facit 4551	Roller bed	B	Pinch wheel	6	No	8	Yes	0.004	N/A	2K	No	No	15.2	\$995	Std.	Std.	N/A	Yes	No	No
Gould Color-writer 6120	Roller bed	B	Pinch wheel	7	No	11	Yes	0.002	± 0.3%	500 bytes	No	No	13.2	\$995	Std.	Std.	N/A	Yes	No	No
Taxan 710	Flatbed	B	Magnetic	6	No	16.5	Yes	0.001	± 0.3%	1K	No	No	20.9	\$995	Chce	Chce	N/A	Yes	No	No
Enter Computer Sweet-P 600	Roller bed	B	Grit wheel	6	Yes	14	Yes	0.004	N/A	15K	No	No	8	\$1,095	Std.	Std.	N/A	Yes	Yes	No
IBM 7371	Roller bed	A	Grit wheel	2	Yes	15	Yes	0.001	N/A	255 bytes	Yes	No	12.5	\$1,000	Chce	N/A	Chce	Yes	No	No
Western Graph-tec MP1000	Flatbed	B	Magnetic	6	No	5.9	Yes	0.004	± 1%	16K	No	No	17.6	\$1,190	Opt.	Opt.	Opt.	Yes	Yes	No
Roland DXY-680	Flatbed	B	Magnetic	8	No	7.9	Yes	0.002	± 0.5%	3K	Yes	No	9.5	\$1,295	Std.	Std.	N/A	Yes	Yes	No
Roland DXY-980	Flatbed	B	Electro-static	8	No	9.1	Yes	0.002	± 0.5%	3K	Yes	No	11.3	\$1,695	Std.	Std.	N/A	Yes	Yes	No
Gould Color-writer 6320	Flatbed	B	Electro-static	10	No	15.7	Yes	0.001	± 0.1%	16K	Yes	Opt. \$395	29	\$1,895	Chce	N/A	Chce	Yes	No	No
Hewlett-Packard HP 7475A	Roller bed	B	Grit wheel	6	Yes	15	Yes	0.001	N/A	1K	Yes	No	16	\$1,895	Chce	N/A	Chce	Yes	No	No
IBM 7372	Roller bed	B	Grit wheel	6	Yes	15	Yes	0.001	N/A	1K	Yes	No	15.8	\$1,900	Chce	N/A	Chce	Yes	No	No
IBM XY 749	Flatbed	A	Electro-static	8	No	17.7	Yes	0.004	± 0.1%	1K	Yes	No	22	\$1,995	Chce	Chce	Chce	No	Yes	No
Houston Instrument DMP-29	Flatbed	B	Stickum	8	No	22.6	Yes	0.001	± 0.2%	1K	Yes	No	25	\$2,295	Chce	Chce	Chce	Opt.	Yes	No
Western Graph-tec FPS301	Flatbed	B	Electro-static	10	Yes	17.7	Yes	0.004	± 0.1%	16K	Yes	Opt. \$700	33	\$3,290	Opt.	Opt.	Opt.	Opt. \$100	Yes	No
Hewlett-Packard HP 7550A	Roller bed	B	Grit wheel	8	Yes	31.5	Yes	0.001	N/A	12K	Yes	Yes	38	\$3,990	Std.	N/A	Std.	Yes	No	No
Houston Inst. DMP-51/52	Drum	D	Grit wheel	1	No	22	Yes	0.001	± 0.1%	1K	Yes	No	32	\$4,495	Std.	N/A	N/A	No	Yes	No
Nicolet Zeta 8	Roller bed	B	Tractor	8	Yes	25	Yes	0.001	± 0.1%	18K	No	Yes	32	\$5,950	Opt.	N/A	Opt.	Chce	Chce	No

Subjective Evaluation				
Bundled software	Quality of construction	Ease of pen use	Ease of paper insertion	Overall plot quality
KeyChart	Fair	Poor	Fair	Very good
None	Good	Fair	Good	Good
Strobe pack	Fair	Fair	Fair	Fair
None	Fair	Fair	Fair	Good
KeyChart	Good	Very good	Very good	Very good
None	Fair	Good	Excellent	Fair
KeyChart	Good	Fair	Fair	Very good
KeyChart	Good	Good	Good	Very good
None	Very good	Very good	Very good	Excellent
None	Good	Good	Good	Fair
None	Fair	Good	Good	Fair
None	Very good	Very good	Excellent	Excellent
KeyChart	Good	Good	Good	Very good
None	Good	Fair	Fair	Very good
None	Good	Fair	Very good	Very good
None	Excellent	Good	Excellent	Very good
None	Very good	Very good	Excellent	Excellent
None	Very good	Very good	Excellent	Excellent
None	Excellent	Good	Excellent	Very good
None	Very good	Good	Fair	Fair
None	Excellent	Excellent	Excellent	Very good
None	Excellent	Excellent	Excellent	Excellent
None	Very good	Good	Good	Excellent
None	Excellent	Excellent	Very good	Excellent

How to Read the Features Table

An explanation of the standard features that PC Magazine Labs evaluated when putting these plotters through their paces.

Paper movement classifies the plotter according to design category: flatbed, roller bed, or drum. **Maximum paper size** is given in the A, B, C, D, and E designations specified by the ANSI standard. Size A is 8½ by 11 inches, B is 11 by 17, and so on up to size E (36 by 48 inches). Some plotters can also accommodate the slightly larger paper sizes of the European standard.

Paper-hold systems are explained in the introductory article. The **number of pens** and whether or not they are **auto-capped** are self-explanatory. **Maximum pen speed** is more complex than it seems because some devices move faster along a diagonal than they can on either the x or y axis, while others move at a constant rate in any direction. This chart gives the fastest movement speed. Almost all plotters allow the **pen speed** to be **adjustable**, but, while some let you specify any speed within their range, others can adjust speed only in fixed increments, which are sometimes set by switches rather than software.

Step size and accuracy are the major determinants of a plotter's ability to create sharp and detailed plots. At least theoretically, the more steps per inch, the better the resolution. Step size is measured in distance units (inches), although sometimes this measurement is translated into the number of steps per inch. The measure of accuracy used here is the percentage accuracy over a long pen move. No industry standard exists for this measurement, but it helps indicate overall pen handling. Many manufacturers quote a repeatability measurement as well, which indicates tolerance when the plotter is asked to return to an exact point. PC Magazine Labs did not test this specification because it depends a great deal on the type of pen. In fact, this spec is usually quoted twice, once for repeatability with the same pen and again, with a worse number, for a different pen. Re-

peatability is also dependent on the device's step size: It isn't possible to be more accurate than the physics of the unit allows. For these reasons, I think repeatability can be misleading.

Buffer size shows the amount of RAM built into the plotter's electronics for storing plotting instructions. Plotters are relatively slow devices, so a large buffer is an advantage because it can accept instructions and return the computer to the operator, then execute the stored commands. This mechanism works just like a printer buffer or spooler, but the benefits are even greater, especially with complex plots. Some of the plotters tested let you expand the buffer size through additional RAM.

Most CAD installations use a digitizing tablet to input graphics information. These devices use a stylus or puck (similar to a mouse) to input coordinates to the computer. Some digitizers perform a similar function by letting you move the pen head with cursor keys to a desired location, then send its position coordinates to the computer by hitting a key on the operator panel; hence, the **act as digitizer** entry. Most plotters aren't especially good at digitizing, since the pens are hard to position by eye and inconvenient; advanced users might sometimes want this feature.

Auto paper feed indicates whether you can feed the media into the plotter and batch process a sequence of plots without manual intervention. Be aware that the software driving the plotter must allow such processing; most business graphics and small CAD programs currently do not.

The **interface** section shows which type of interfaces are available or standard. Most personal computers use either serial RS-232C or parallel Centronics interfaces. The IEEE interface, also known as GPIB (General Purpose Interface Bus) or HPIB (Hewlett-Packard Interface

Bus), is designed primarily for scientific and control applications. An entry of "std" means that the particular interface is always included; "n/a" means it isn't offered; and "chce" (choice) means that the purchaser can choose one interface from the listed options. An "opt" entry in addition to "std" indicates that options are available.

The **programming** section lists graphics command languages. HPGL, the Hewlett-Packard Graphics Language, is emerging as a de facto standard. **Proprietary** indicates a manufacturer's own command set. Many designers now use HPGL as their standard and sometimes only command language, while others offer HPGL emulation as an option either in place of or in addition to their proprietary language. **Other** shows where a designer chose to emulate a graphics language other than HPGL. **Bundled software** indicates whether any commercial graphics software is included with the plotter.

Subjective evaluation reflects my own impressions: how well the plotter is constructed; how easy it is to use the pens, insert and remove them from the pen head, and cap them if they need capping; how difficult it is to insert and fasten the media, and make it lie completely flat; and overall plot quality.

This last factor is the most important—and perhaps the most subjective—of all. Many factors that contribute to a good plot, including how precisely the plot elements join together, overshoot (especially on diagonal lines), pen tip width, ink type and quality, media used, and others. Some of these are beyond the control of the plotter, and some are not. I tried to keep as many factors constant as possible, but each manufacturer determined such things as what pen types to include with the sample plotters for evaluation. The enlargements accompanying the reviews help show how the plots looked, but the review itself is what conveys how the output looked.

Finally, as described in the accompanying sidebar on benchmarks (see "Test-

ing Methodology"), PC Magazine Labs ran two benchmark tests: one that used the plotter's internal ROM-based text font, and another that generated fancy and complex text fonts under software control. While the software font plots always created the same basic result, the quality of the internal ROM fonts varied widely. The attractiveness of the ROM font (or its lack) determines whether you can save time by using the ROM font and still produce plots that are acceptable for the intended audience.



If a plotter emulated a foreign graphics language (usually HPGL), PC Magazine Labs generated and timed plots in this mode. In some cases the emulation mode exacts a time penalty; in others both the native and emulation modes are equally fast.

The ROM font timings are the most important ones to use in judging relative performance, since they reflect the absolute throughput that the device is capable of. Some interesting differences arose in the software font timings, too, but these are affected by so many factors that it's difficult to use them for making definitive judgments. —Glenn Hart

Enter Computer Sweet-P 600

The Sweet-P 600 from Enter Computer Inc. is a six-pen plotter inspired in many ways by the HP 7475A. It is not as well built and seems fragile in some parts. The rotating pen carousel is especially flimsy, although it does feature pen capping. Unlike the HP, the 600's carousel area allows tall pens to be used, but the carousel probably wouldn't be strong enough to accommodate large and heavy pens. Pens designed for the HP line will fit the 600 as well, so there's an adequate pen selection available.

The 600 has both serial and parallel interfaces and uses very standard, simple cabling. It is easy to interface and presents no surprises or problems with either the serial or parallel connection. Only one eight-position DIP switch need be set if the serial interface is used, and the switch is readily accessible on the rear panel.

The 600 offers both SPGL—Enter Computer's own graphics language—and HPGL. The two languages seem quite similar, with many identical commands, but there are some differences, too. The details are spelled out in a separate technical and programming manual that was not supplied with the test unit.

The operator's manual is only some 20 pages long but is clearly written and contains sufficient information to operate this essentially simple device. The operator panel has only three buttons, only one of which invokes a demo plot. There are no pen movement controls at all. Thus the control options are rudimentary, to say the least.

The benchmark plots show the 600's speed to be in the middle of the pack. It plotted in its native SPGL and in the HPGL emulation at the same speed. The internal

PC FACT FILE

Sweet-P 600
Enter Computer Inc.
6867 Nancy Ridge Dr.
San Diego, CA 92121
(619) 450-0601
List Price: \$1,095

CIRCLE 607 ON READER SERVICE CARD

text font was very similar to the HP 7475A's and would be acceptable to most users.

Unfortunately, the plots themselves might not be acceptable to a critical user. Their sloppiness and general lack of precision is annoying compared to the output of the better plotters in this project. The plots don't look really bad, and perhaps the

problems wouldn't be critical to beginners or users who haven't seen the output of competitive plotters.

The 600's price is moderate, but so is its performance. There are many things to like about the plotter, including a very high level of compatibility, easy installation, and reasonable speed, but it's the final output that counts.



Enter Computer Sweet-P 600



IBM 7371

IBM 7371

Before the HP 7475A was introduced and became the market leader, Hewlett-Packard offered a smaller A-size-only model called the 7470. This plotter, which is still marketed by HP, holds only two pens—one on either side of the plot bed—rather than a carousel of six pens like the 7475A.

IBM, which markets the large HP 7475A as its 7372 (see the companion reviews of both machines), also sells a version of the HP 7470 as its IBM 7371. Like its larger IBM relatives, the 7371 looks slightly more attractive than the original HP version, but the differences are mainly cosmetic. Functionally, the two versions are identical.

The fiber-tip pens used in the 7371 are the same as those in the larger version: excellent quality and available in a wide variety of widths. The two pens are capped in their holders when not in use. Much software on the market includes the logic to pause for pen changes with the HP 7470 and this model, so multicolor plots don't present a problem as long as the operator is around to make pen changes when necessary.

The standard HP grit-wheel system moves the media around. The operator panel of the 7371 is similar to the six-pen 7372's but obviously has fewer pen selection buttons. The serial interface is totally standard and simple to connect. IBM has also written new documentation for the 7371, which, like the 7372's, is excellent.

The plots produced by the 7371 were gorgeous: crystal clear and accurate, with perfectly straight diagonal lines. Even though the 7371 and 7372 are rated at exactly the same pen speed, the smaller plotter was somewhat faster with our ROM font benchmark. Possibly, this speed results from eliminating the time it takes to



Model 7371

IBM Corp.
Neighborhood Rd.
Dpt. 30L-948
Kingston, NY 12401
(914) 385-5151

List Price: \$1,100

CIRCLE 679 ON READER SERVICE CARD

PLOTTERS

rotate the 7372's carousel and fetch new pens (I ran the 7371 with no color changes to eliminate any delay from manual pen changes). Both plotters took almost exactly the same time on the slower software font test. Overall, the 7371's speed is in the middle of the pack. It isn't a rabbit, but neither is it a turtle.

Although I don't have statistics, I suspect many business users use mostly A-size charts for their presentations and overheads. If this is so, the 7371 can do everything the larger 7372 can (except handle six pens) at significantly lower cost. On the other hand, several plotters in the same price range as the 7371 can produce B-size plots as well. And, the extra cost of the 7372 isn't all that much, at least to a business.

For some companies, the possible benefits of IBM service may count heavily in the favor of the IBM versions of Hewlett-Packard plotters. The 7371 is an excellent device, but I'd be tempted to get the larger 7372 for the extra pen-handling convenience and, of course, the ability to produce larger plots. ■

Roland DXY-880

The Roland DXY-880 is a step up from its lower-cost sibling, the DXY-800 (also reviewed in this article). While both the 800 and the 880 are clearly cut from the same cloth in design philosophy and share a number of common assemblies, the DXY-880 is a more satisfying device in many respects.

Like the 800, the DXY-880 has the same B-size metal flatbed design, the ability to run in a more or less upright position, the external power supply, and the hinge-and-magnetic-strip system for holding down the paper. Construction quality is

good but not tanklike. Its eight-pen non-capping pen bay appears to be identical to that used in the cheaper plotter, and the same pens are supplied with both units. Roland offers an unusually wide selection of pen options in water- and oil-based fiber-tips, ballpoints, and ceramic tips.

The operator panel of the DXY-880 is greatly improved, with a good complement of membrane controls that work smoothly and positively. Digitizing has been added. A 3K-byte buffer is included as standard equipment. Similarly, the documentation is vastly superior to the poor-quality manual supplied with the 800. A very useful and informative four-page plastic reference card accompanying it lists switch settings, language commands, internal font characters, and more.

Last, and most important, the proprietary DXY command set now includes an emulation of HPGL. Roland calls it "RD-GL," but the net effect is the same.

The DXY-880 is rated faster than the 800 while offering twice the resolution. Its performance, however, was still average or below average when compared to competitive plotters. Plot clarity was excellent, and the internal text font was also first rate. Its HPGL emulation worked very well. As with the other Roland plotters, it is somewhat difficult to achieve perfect paper flat-

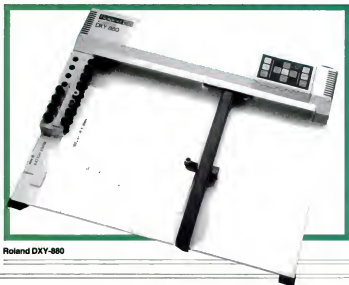
ness even when the plotter is used horizontally; tilting it with the attached stand makes matters somewhat worse. Incidentally, the self-test is the prettiest among the plotters I tested.

The DXY-880 produces fine output and is HPGL compatible. It has some rough edges and only fair speed, but overall the DXY-880 is a nice piece of work. ■

Roland DXY-980

The senior member of the Roland triumvirate of moderately priced flatbed plotters is the new DXY-980. It is basically similar to the DXY-880, but with enhanced performance specifications and several new features.

The most significant addition is the electrostatic paper-holding system, unusual for a plotter in this price bracket. The electrostatic system solves all the problems associated with the mechanical-magnetic hold-down system used in the other Roland plotters, and the DXY-980 can really be used in the convenient tilted position the other Roland models also offer. A small plastic piece under the pens eliminates unwanted pen marks made while installing



Roland DXY-880



DXY-880
Roland DG
7200 Dominion Circle
Los Angeles, CA 90040
(213) 685-5141
List Price \$1,295

CIRCLE 618 ON READER SERVICE CARD



Roland DXY-980

the media; this bracket should be put on the other plotters as well.

The DXY-980 also claims a speed increase over the DXY-880 to 9 inches per second. This rate is still not as fast as some competitive plotters, but every little bit of speed helps. The pen control system has been enhanced to allow the use of liquid-ink pens by softening the pen touchdown pressure and adding a system to raise the pens after a period of no movement. An interesting new connector on the rear panel makes plotter-motor control signals and pen up/down status signals available for the control of external stepping motors and similar devices, while external signals can be read by the DXY-980 and passed on the host computer.

The other new feature added to the DXY-980 is flashy but not all that useful: a digital readout of the x and y coordinate values at the current pen position. There

may be some occasional need for manually setting scaling points that define the boundaries of a plot and for program debugging, but the readout adds more glitz than substance.

Performance was substantially better

Each step up the Roland ladder yields either improved performance, more features, or both.

than the DXY-880's on both ROM font and software font benchmarks. The speed increase moves the 980 up several notches in the speed rankings without any noticeable degradation in quality. The test DXY-980 drew reasonably good quality plots in either the native DXY command language or the HPGL emulation. The electrostatic hold-down is, as with almost all such systems, excellent.

Each step up the Roland ladder yields either better performance, more features, or both. The DXY-980 is clearly the best of the bunch: It's pleasant to use and a good value.

Gould Colorwriter 6320

The Gould Colorwriter 6320 is a massive flatbed plotter that offers a wide range of features, plus the promise of high reliability and professional performance at a midrange price. You can even add an optional automatic paper feeder for continuous plotting in high-volume or unattended applications.

The 6320 is one of the heaviest B-size plotters I tested. While undeniably large, it is very nicely styled and does not appear bulky or awkward. A lovely lucite dust cover is included to protect the plot surface when not in use. Gould used an electrostatic paper hold-down system on the attractive, textured, white plot bed, which is clearly marked for media positioning.

The operator panel is both beautiful and flexible. In addition to the normal buttons for pen movement, pen selection, and the like, it includes buttons to invoke a digitization mode, reset the plotter, change the drawing scale, force plots to be drawn with a single pen, change pen speed, and more.

The Colorwriter 6320 holds ten pens in simple holders without any capping mechanism, a weakness when compared with some competitors' machines, whose caps let you avoid removing the pens after each session to prevent them from drying out. Gould offers a wide range of pens; Rotring and Pentel pens can also be accommodated with an adapter. Interfacing the RS-232 plotter was quick and easy: I encountered no special problems.

With all this superb construction and professional feel, the results of my testing were slightly disappointing. The 6320 was not as fast as its specifications would suggest. Plot accuracy was only very good, not excellent. However, operation is quieter than many plotters, and overall feel is smooth and solid. The 6320 has the same "reduction" mode as the Gould 6310 for

PC FACT FILE

DXY-980
Roland DG
7200 Dominion Circle
Los Angeles, CA 90040
(213) 685-5141
List Price: \$1,695

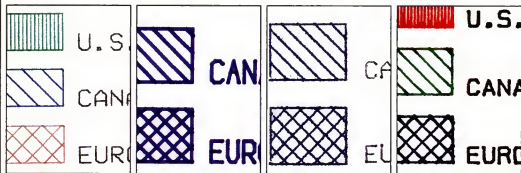
CIRCLE 682 ON READER SERVICE CARD

PC FACT FILE

Colorwriter 6320
Gould Inc.
3631 Perkins Ave.
Cleveland, OH 44114
(216) 361-3315
List Price: \$1,895

CIRCLE 682 ON READER SERVICE CARD

Plotter Output: A Close-Up Comparison

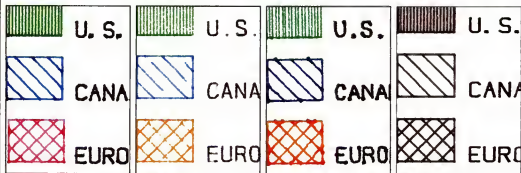


Sharp CE-515P

Strobe M250

C. Roh CX-4800

Epson HI-80

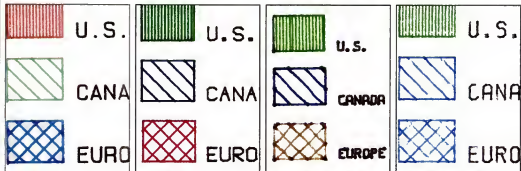


Taxan 710

Facit 4551

Enter Computer Sweet-P 600

IBM 7371



IBM 7372

IBM XY/749

Houston Instrument DMP-29

Western Graphitec FPS301

Each plotter generated a standard chart using ROM fonts. From these, we extracted a sample and blew it up to show differences in quality.



Houston Instrument 695



Roland DXY-800



Apple 410



Gould Colorwriter 6120



Roland DXY-880



Roland DXY-980



Gould Colorwriter 6320



HP 7475A



Western Graphtec MP1000



HP 7550A



Houston Instrument DMP-51/52



Nicolet Zeta 8

PLOTTERS



Gould Colorwriter 6320

use with commercial HPGL programs, but *PC Magazine's* standard A-size benchmark fit fine without it.

The Colorwriter 6320 is a lovely piece of equipment. Gould has done an excellent engineering and design job, documented it well, and priced it very fairly. The plotter feels like it would handle anything thrown at it for a long time. If only the plots were just a bit faster and a bit better, the 6320 might run away with its segment of the plotter market. ■

HP 7475A

The HP 7475A has become the de facto standard in moderately priced desktop plotters. This dominance is partially the result of early market entry and confidence in the Hewlett-Packard name, but does the plotter itself justify this exalted status? Basically, yes it does.

Interfacing the HP 7475A is easy; the connections are as standard as RS-232 ever gets. Construction quality is good. The plastic housing is neither incredibly strong nor particularly heavy, but the unit's over-

all feel is commensurate with its price.

HP led the way in automatic pen capping, and only recently have competitors begun to offer this important feature. The HP 7475A uses a six-pen rotating carousel with pens capped solidly by rubber rings. It's easy to change pens, but the design prevents you from using any pens longer than the HP items. However, HP offers a decent selection of colors in pens with narrow and wide tips for both paper and overhead transparencies. The company recently added a carousel that uses small refillable liquid-ink pens as well.

The HP 7475A moves its media by grasping it on each side with grit-coated pinch wheels. A-size paper is inserted one way and B-size the other, taking advantage of the fact that normal paper sizes have a common 11-inch dimension. Either ANSI A/B or ISO A4/A3 paper can be handled by changing the position of the right-hand

pinch wheel. While the plotter itself is reasonably compact, quite a bit of space in front and behind the unit is needed to allow for paper movement.

The operator panel has an abundant quota of solid push-buttons to perform the pen movement and other standard functions. One unusual feature is "view," which suspends plotting and moves the paper to make the entire sheet visible.

Documentation is simply superb. Two beautifully typeset and illustrated manuals cover interfacing, programming, and operation, including very detailed installation instructions with copious examples for various computers.

The HP 7475A produced crisp, precise plots. Diagonal lines are perfectly rendered. Speed and noise level are both moderate. The internal character font is quite attractive and would be acceptable in most business presentations. The new liquid-ink system worked perfectly and produced magnificent plots on vellum.

The HP 7475A is one of those rare products that seems to be more than the sum of its parts. Its construction and performance are solidly middle of the pack, but somehow it gives you enough satisfaction to transcend this assessment. ■

IBM 7372

There was a time when IBM made just about everything it sold (or, perhaps more accurately, leased). Memory chips, CPUs, printers, terminals—I don't go back far enough, but I wouldn't be surprised if IBM even made the tubes for its ancient mainframes, too.

In recent years, IBM has begun to secure at least some of its products from outside manufacturers—a trend that has been accelerated by the popularity of the PC. IBM has found, much to the surprise of its more antiquated officers, that the world continues to revolve even though it uses outside parts and even sells products as an OEM for other vendors.

The IBM 7372 plotter is a fine example of the wisdom of buying peripherals outside the Mother Ship. As I have discussed elsewhere in this article, the Hewlett-Pack-

PC FACT FILE

HP 7475A
Hewlett-Packard Co.
16399 W. Bernardo Dr.
San Diego, CA 92127
(619) 487-4100
List Price: \$1,895

CIRCLE 683 ON READER SERVICE CARD



HP 7475A



IBM 7372

and 7475A has achieved a dominant position in the desktop plotter market because of its performance, size, reliability, and price. IBM has now released a 7475A clone as its new Model 7372 plotter.

The OEM process sometimes results in products differing markedly from the orig-

inal, with the purchaser adding design, thought, software, or other elements to the final product. For example, all the various laser printers based on the Canon laser engine have very different flavors.

Here, however, there is essentially no difference between the IBM and Hewlett-

Packard versions. The plastic flip-up cover is smaller on the IBM, the rotating pen carousel has its own cover, the push buttons on the operator panel are black instead of beige, but that's about it. The IBM winds up looking a little more solid and even prettier than the HP, but functionally the two plotters are identical in every way.

The 7372's command language is absolutely standard HPGL, although IBM takes great pains to call it IBM-GL and avoids mentioning HP anywhere in the documentation. This head-in-the-sand approach is a disservice to buyers who should know that the tremendous base of software designed for the HP 7475A will work with the IBM 7372 as well.

The IBM version adds a serial cable that interfaces perfectly with its PCs. It also includes a "wrap cable," an RS-232 plug that has its internal wiring crossed, allowing a serial port to talk to itself for troubleshooting.

IBM's documentation for the 7273 is totally new. It is very well written and abundantly illustrated, but it does not include nearly as much as the HP manual for the 7475A. IBM devotes a staggering 159 pages to showing how to connect the plotter to PCs and various high-end graphics devices but contains no description of the programming language. You must purchase a separate manual to learn how to program the plotter.

The IBM 7372 benchmark times were identical with those of the HP 7475A within a second or two. The clarity and accuracy of the results matched those of the HP, which means they were excellent.

Some will buy the 7372 simply because they buy everything from IBM. Service considerations that favor the IBM unit as well. Since the price of the IBM 7372 and its HP 7475A cousin are essentially the same, you more or less "pays your money and takes your choice."

PRICE FILE

Model 7372

IBM Corp.
Neighborhood Rd.
Dpt. 30L-948
Kingston, NY 12401
(914) 385-5151

List Price: \$1,900

CIRCLE 684 ON READER SERVICE CARD

PLOTTERS

IBM XY/749

Microcomputer users tend to think of IBM as only the Entry Systems Division, but other units of this huge conglomerate produce products compatible with the PC as well. One such is the IBM Instruments group located in Danbury, Connecticut, which offers laboratory-oriented microcomputer systems of its own design. It also sells flatbed plotters as an OEM from Calcomp, a long-time plotter manufacturer, one of which is the XY/749. (Another arm of IBM sells OEM versions of the HP-based 7371/7372 plotter family.)

The XY/749 is an A-size flatbed. A B-size version, the XY/750, has been discontinued. The XY/749, which IBM Instruments indicates it will continue to sell, is an eight-pen design with unusually solid construction. IBM Instruments offers a very wide selection of disposable pens for paper and transparencies, metal-tip, liquid-ink drafting pens, and ceramic-tip disposable pens. The pens fit in bays along the left side of the plot bed; they are not equipped with any automatic capping mechanism.

The XY/749 holds down media with an electrostatic system, the most desirable method of adhesion for a flatbed. A very solid operator panel includes controls for pen manipulation, special options, and more. Serial RS-232, parallel, and IEEE interfaces are available. Setting up the XY/749 was straightforward; the plotter can print a listing of the interface settings to aid you in this process.

The XY/749 uses a proprietary command language that appears to be directly compatible with the Calcomp commands, but no HPGL-compatible language is available. The documentation is technical

and reasonably complete, but it will never match the lush manuals supplied with the IBM 7371 and 7372.

The XY/749's output was excellent; its renditions of the test charts were very crisp and accurate, although the internal ROM

The XY/749's output was excellent; its renditions of the test charts were very crisp and accurate, although the internal ROM character set was only somewhat appealing.

character set was only somewhat appealing. Its speed, though, was quite slow—borderline for a plotter of this class.

The XY/749's biggest problem is its price. Excellent construction is important, perhaps even more so in scientific and laboratory environments than in common business situations, but the \$2,000 price bracket includes some very attractive competitors (including IBM's own 7372) that can produce equally impressive plots in less time. ■

Houston Instrument DMP-29

Houston Instrument's DMP-29 is a well-built B-size flatbed plotter that has gained a solid reputation for reliability. Unfortunately, its performance in other respects is rather disappointing.

In the DMP-29 hold-down system, the top edge of the media is held by stickum (which means it's pressed against a strip of sticky material), and the bottom edge is held in a loose slot. Inserting the media sometimes leaves "bumps" in the paper that brush against the moving pen and disfigure the plot. Since the clearance in the pen storage area is tight, pen marks can occur during media insertion. Another problem is that the sticky strips also gather dirt and dust over time and need to be kept clean to maintain their stickiness.

The DMP-29 has no capping mechanism of any kind, and the eight pens are stored along one edge of the plot bed. Houston Instrument offers a limited array of pen types (nine or ten colors for use with fiber-tip pens on paper and film), but third-party suppliers broaden this choice somewhat.

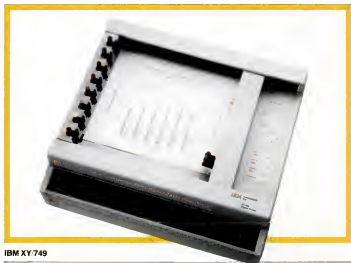
PC FACT FILE

XY/749 Digital Plotter

IBM Corp.
Neighborhood Rd.
Dpt. 30L-948
Kingston, NY 12401
(914) 385-5151

List Price: \$1,995

*RGL 692 ON READER SERVICE CARD



IBM XY 749



Houston Instrument DMP-29

The plotter connects simply with the RS-232 serial interface. Houston Instrument also offers both Centronics parallel and IEEE interfaces. The company's DMPL graphics language is standard, but an optional set of HPGL-compatible ROMs is available as well. Documentation is dry but adequate.

The operator panel is excellent—one of the best in its class. It has a large assortment of controls whose "feel" is positive and satisfying.

The DMP-29's output quality is far less pleasant. Diagonal lines are extremely wavy—the worst of any plotter I tested. This waviness indicates a serious lack of penhead control. The plotter's speed is average; its performance in the PC Magazine Labs' benchmark tests puts it in the middle of the pack. The internal text font is not particularly attractive.

To be as fair as possible, I checked out

another sample unit of the DMP-29 to be sure that the test unit was not simply malfunctioning, but the second plotter produced plots that were very similar in appearance to those of the first unit. Appealing appearance and good construc-

The FP5301 is fast, and the quality of the output was generally very good, save for some slight waviness in diagonal lines. The oil-based pens supplied with the unit were especially impressive, drawing incredibly sharp plots.

tion are nice, but output quality is the ultimate judgment criterion for a plotter. Perhaps the unit is overrated and would do a better job at a slower speed, but isn't throughput speed one of the things you pay for in an over-\$2,000 plotter? The DMP-29's performance simply isn't up to snuff—or up to the competition.

Western Graphtec FP5301

The Western Graphtec FP5301 is a heavy and beautifully made flatbed plotter. However, creative engineering, top-rate construction, and high-speed performance are offset slightly by weak documentation, high cost, and a minor lack of precision in the finished plots.

Unpacking instructions are in Japanese only, but it is not difficult to decipher what to do. The plotter comes with water-based fiber-tip pens and oil-based ballpoint pens. An RS-232 connector and hood are supplied as loose parts. Also, I found two unattached screws floating around in the carton, which shouldn't happen with a package of this quality and price.

Interfacing the FP5301 was an adventure. Three eight-position DIP switches must be set; this requires removing the plug-in RS-232 interface card. The plotter arrived with its internal self-test enabled, so removing the card was unavoidable in any case. Western Graphtec also uses a somewhat nonstandard cable configuration. The rather murky documentation did not help much; it is detailed but difficult to decipher, even for experienced users.

Once the interfacing was accomplished, the positive aspects of the FP5301's personality began to emerge. A sleek, elegant front control flips down, showing abundant controls that have a satisfying, solid feel. LEDs indicate status and errors; the LEDs are even duplicated on the outside of the fold-down panel so that they are visible when the door is closed.

Ten pens are stored in self-capping holders at the rear of the plotter. The FP5301 senses the type of pen selected and controls pen speed and pressure accordingly; this yields better-quality plots and long-



DMP-29
Houston Instrument
8500 Cameron Rd.
Austin, TX 78753
(800) 531-5205
List Price: \$2,295

CIRCLE 681 ON READER SERVICE CARD



FP5301
Western Graphtec Inc.
12 Chrysler St.
Irvine, CA 92718
(714) 770-6010
List Price: \$3,260

CIRCLE 688 ON READER SERVICE CARD

PLOTTERS

er pen life. Western Graphtec offers six types of pens: ink, both water- and oil-based fiber-tips, water- and oil-based ballpoints, and, optionally, pencils. A paper feeder that uses 40-meter-long rolls and an integral paper cutter is optional.

Another major feature is an electrostatic hold-down system, which is much better than the sticky or magnetic strips found on most flatbed plotters. Besides holding down the media steadily without causing buckling, this method can hold media of any size that fits on the bed.

Performance is generally excellent. The FP5301 is fast, and the quality of the output was generally very good, save for some slight waviness in diagonal lines. The oil-based ballpoint pens were especially impressive, drawing incredibly sharp plots. Operation was also smooth and precise, albeit a trifle noisy. The internal text font was ugly, though, and probably would not be acceptable for business presentations.



Western Graphtec FP5301

Plotter Terminology

Plotter talk has a vocabulary of its own.

A series of complex interactions between the type of pen tip, the properties of the ink, the characteristics of the media, and the design of the plotter determines the quality of the plot. Each of these factors can be optimized for best results.

Pens are generally classified by the type of tip and the type of ink. The more common types include:

Fiber-tip

The tip, usually made of nylon or another synthetic material, varies in hardness, and therefore longevity. Fiber-tip pens are available in a range of narrow to wide tip widths and run best at medium speeds. They can use either water- or oil-based inks, which come in highly saturated colors. These pens work well on bond paper and can be used on clear film with oil-based ink. They last for quite a while, but the tip can broaden and lose sharpness over time—especially if the plotter applies too much pressure, or if the surface

of the media is too abrasive. You must cap fiber-tipped pens immediately after use to prevent drying.

Ballpoint

Ballpoint pens offer consistent line widths that don't vary over time and often do not require capping. Color saturation is usually less than with fiber-tip pens, but sharpness may be better. Specialized ballpoints, pressurized to force the ink out smoothly, are available and can be run at much higher speeds than many other pen types; they can also bear a higher pressure. Ballpoints work well on paper and vellum but are obviously unsuited for transparency materials.

Liquid-ink pens

Liquid ink is, in many ways, the king of the pen systems. The quality of the lines drawn with liquid ink is superb, and the line width tends to be very stable. You can choose from a wide range of tip widths, and even select the metal in the

tip according to what best suits the media you're using. Liquid-ink pens carry both water- and oil-based inks, and you can select the ink for optimal viscosity, drying characteristics, and other factors. However, there are trade-offs. Liquid-ink pens work best at slower speeds, and, since you must pour or otherwise transfer ink into a reservoir in the pen just before using it, their handling and maintenance can be messy. Clean-up can be a major inconvenience, and some vendors offer various cleaning solvents, magnifying glasses, and even ultrasonic cleaners to help keep all the necessary pieces unclogged. New disposable liquid-ink pens offer much of the same performance with much less annoyance.

Liquid roller pens

Offering a simpler way to use liquid ink, liquid roller pens come close to the line quality of traditional liquid-ink pens but operate at significantly higher speeds and are much less aggravating to use. Special

The FP5301 was tested with Western Graphtec's own language and with HPGL ROMs installed. Performance was similar. Western Graphtec claims only 75 to 90 percent HPGL compatibility, but I had no problems with either the benchmark plots or with standard HPGL graphics produced by Autodesk's AutoCAD.

The FP5301 is a major-league plotter that more than justifies its cost. The documentation should be much better, but the performance is generally hard to fault. ■

Western Graphtec MP1000

The Western Graphtec MP1000 is a well-constructed flatbed plotter that's reasonably priced and produces good-quality plots. Its appearance is distinguished by a handle built

into the rear portion of the machine.

Setting up the MP1000 is easy, but the manual doesn't provide any cable connection guidelines. Fortunately, a PC cable was included with the test unit, and everything worked when configured correctly. A six-pen holder uses magnetism to hold the pens in position but has no capping mechanism. Oil- and water-based fiber-tip pens are available, as are ink reservoir pens. Four magnetic strips hold the paper down. B-size paper is easy to line up, but the steel plot bed has no markings to correctly position A-size paper.

The MP1000 has a simple membrane operator panel. At first glance, it appears to have a nine-position switch grid, but only the four main directions actually function. The working positions do double duty, but the control options are limited; the machine has, for example, no mechanism to retrieve or store pens and no pen speed adjustment. Pen movement is both slow and among the noisier of the units

tested, producing a disquieting "clunk" every time the pen is lowered to the paper. This noise may be partially caused by the rather long distance the pen is raised and lowered, but it makes one wonder about the long-term effect on the pen tip.

The quality of the PC Magazine Lab's test plots was generally good. However, the internal ROM font is unattractive and would not be acceptable to many business users. All the magnetism used for holding things in place means that floppies are definitely verboten in the vicinity. The manual does include appropriate warnings, but someone may throw a floppy down on the



MP1000
Western Graphtec Inc.
12 Chrysler St.
Irvine, CA 92718
(714) 770-6010
List Price: \$1,190

CIRCLE 677 ON READER SERVICE CARD

versions are available for even higher writing speeds. As with other liquid-ink pens, bond paper and vellum are suitable media.

Various materials are used to plot on. The different types of media fall into the following classes:

Standard bond and chart paper

Many users find standard copier paper suitable for test plots and other noncritical applications. Chart paper is a somewhat higher-quality bond paper designed specifically for plotting. Ballpoint and liquid-ink pens work best on such papers because fiber-tip pens are sometimes worn by the relatively rough paper surface, and the absorbency of the paper can cause ink spread, which results in loss of definition.

Coated bond presentation paper

This heavyweight plotter paper is coated on one side with a high gloss finish that, when used with the right pens, yields attractive plots. Fiber-tip and liquid-ink pens work very well on such coated stock, but some inks require a slower speed for perfect coverage.

Vellum

Vellum is a strong plotter paper treated with special substances that prevent fading. It works best with liquid inks and ballpoints.

Overhead clear inking film

This is the basic media used for overhead transparencies in business presentations. For the most part, only fiber-tip pens are used to plot on this material. Oil-based inks are generally used, although there are some special films that accept water-based inks. Some films are supplied with a paper backing for better handling. It is almost always necessary to slow plotting speed down significantly to allow good lines without skipping.

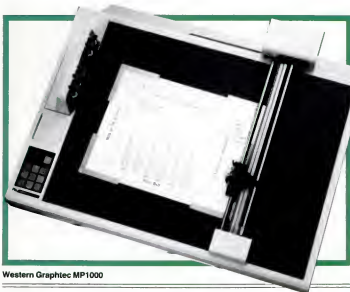
Mylar

Mylar polyester film—because of its stability and insensitivity to humidity and temperature—is used primarily for archival plotting and applications where handling will be heavy. However, its surface is highly abrasive and can wear down normal pen tips. Therefore, special tungsten tips for liquid-ink pens designed to be used with Mylar film give the best re-

sults. Some polyester films are coated with silica particles and processed further to improve ink adhesion. The plotter's main role in this scenario is to apply the correct pressure when it forces the pen down onto the media and to move the pen at a speed suitable for the pen tip/ink-media combination. Pen speed isn't much of a problem, since most plotters and plotter software allow you to vary the speed, but pen pressure is another question altogether. Most low-end and midrange plotters simply ignore the issue entirely. Some high-end units adjust the pressure automatically after sensing the pen type inserted, while others require manual or software adjustment.

For the most part, many of these complex interrelationships have been worked out for you by the plotter manufacturers. Since there is little compatibility between pen types from one manufacturer to another, each manufacturer is free to optimize the pens supplied with its specific plotters. It may also be advisable to buy plotter paper from the maker of your plotter, since it is likely to be more compatible with the maker's pens and the plotter's behavior.—Glenn Hart

PLOTTERS



Western Graphtec MP1000

MP1000 at some point and get an ugly surprise. I tested both the standard Western Graphtec graphics language and the optional HPGL ROMs. The HPGL ROMs were slightly slower, but the plots appeared identical with either command set. The MP1000 is very nicely built and produces good quality plots, but its slow and noisy performance, mediocre manual, and other weaknesses leave me cold. I understand that a much more advanced model in the same price range will be forthcoming from Western Graphtec shortly, and perhaps it makes sense to wait. ■

HP 7550A

Hewlett-Packard's HP 7550A is a bridge between the company's desktop plotter line (the 7470 and 7475A) and its larger engineering and CAD plotters. It has many of the features of the larger plotters but still produces drawings up to B size only.

The 7550A is much larger than its desktop juniors. In fact, though the 7550A is a roller bed plotter, it had the largest foot-

print of any desktop unit I tested, even not counting the space necessary in front and in back of the plotter for media movement. Construction quality is excellent.

The 7550A's eight-pen rotating carousels are much larger and accommodate taller pens than the six-pen 7475A type, al-

though the same pens are used, at least for plotting on paper. HP offers disposable liquid ink, roller pens, and other extras for the 7550A—a much broader selection than that available for the smaller HP plotters. Different pen types use different carousels, all of which are automatically capped to prevent pen drying. The plotter senses the number and type of pens during initialization and automatically adjusts pen speed and pressure as required. This advanced feature works even if pens are intermixed in a carousel. Pen speed is rated at up to 32 inches per second, although HP's fastest recommended setting with real pens is about 20 inches.

Perhaps the biggest attention getter is the 7550A's automatic media feeder. Unlike the roll or tractor feeder used in most other autoseed plotters, the 7550A has a 150-sheet input tray like a copier. The sheets are fed quickly and smoothly into the normal paper position, and finished

PC FACT FILE

HP 7550A

Hewlett-Packard Co.
16399 W. Bernardo Dr.
San Diego, CA 92127
(619) 487-4100

List Price: \$3,900

CIRCLE 600 ON READER SERVICE CARD



HP 7550A

plots are ejected into a catcher behind the plotter. The media is held to the roller bed with a relay-actuated grit wheel system.

In addition to an assortment of positive push-buttons, the operator panel includes a 32-character LCD panel for messages. It displays a series of option menus; four keys adjacent to the display are used for a tree-structured process of configuration and option selection. The unit has no DIP switches, and the display and thoughtful design makes operating this complex device simple. Both RS-232 and HP-IB interfaces are standard. The serial cabling is completely straightforward, and HP's documentation is, as usual, superb.

HPGL is the standard graphics language, with several extensions over the version for the 7400 plotter series. For example, commands are included to control the 7550A's "configurable graphics memory," five RAM buffers that can be sized to fit special needs and improve throughput.

Testing the 7550A was a delight. The automatic paper feeder worked flawlessly, and even manual feeding was unusually easy and solid. The LCD panel enhanced both interfacing and operation. More importantly, the plots were models of clarity, sharpness, and accuracy. Speed on the ROM font benchmark was among the fastest of those I tested, and the internal ROM font was very attractive. The plotter was almost eerie in its silence.

I tested the 7550A with its writing speed adjusted to the full 32 inches per second. The degradation in the plots produced was minimal or nonexistent with the normal fiber-tip pens, but throughput hardly increased. Changing to 9600 baud from the 2400 baud used in the standard tests did not make too much difference on the ROM font chart (although the timing did drop below the magic 2-minute mark), but the software-font test time was cut in half. The Nicolet Zeta 8 and Houston Instrument's DMP-51/52 would also probably benefit similarly from maximum baud usage.

The 7550A excelled in almost every performance area. The automatic sheet feed is a blessing for business users who can now easily produce original color plots for a large number of presentations. The 7550A's performance was so superior that it merits consideration even if autofeed isn't critical. ■

Houston Instrument DMP-51/52

One of the hottest categories in microcomputerdom is CAD systems. The plotter often chosen for entry-level micro CAD systems has long been Houston Instrument's DMP-41/42, primarily because it is by far the least expensive plotter capable of generating the D-size plots needed in most CAD applications.

The DMP-41/42 betrays its super-low cost, however, by its limited performance. Many CAD buyers find that the reduced throughput caused by the DMP-41/42 might more than justify buying a more costly but faster plotter.

Houston Instrument's DMP-51/52 addresses exactly this issue. It is four times faster than the 41/42, its servomotor design improves accuracy dramatically, and it has more-advanced control functions. Though 50 percent more expensive than the 41/42, the DMP-51/52 still costs much less than most other D-size plotters.

The DMP-51/52 is basically a roller bed device, although Houston Instrument (HI) calls it a drum plotter. The large paper it uses flops around in front and behind the

plotter at high speed. Paper is held down with grit and pinch wheels at both edges of the paper, and a vacuum hold-down system assures flatness in the immediate vicinity of the pen head. This design works beautifully, but you can use only C- and D-size paper. Commercial users probably won't mind this limitation very much, but the ability to make A- and B-size plots can be handy for drafts and reduces paper costs. Some other plotters of similar design use sliding pinch systems that allow you to use smaller paper, and the DMP-51/52 can be faulted slightly for lacking this ability.

The DMP-51/52 has only a single-pen station; plots using multiple colors or pen widths require changing the pen manually during the plot. HI offers "MP" versions that store up to 14 pens for another \$1,500 or so. A wide variety of pens, drafting tips, inks, and other drawing tools is available from HI and third-party suppliers. The pens that came with the test plotter were



DMP-51/52
Houston Instrument
8500 Cameron Rd.
Austin, TX 78753
(800) 531-5205
List Price: \$4,495

CIRCLE 665 ON READER SERVICE CARD



Houston Instrument DMP-51/52

PLOTTERS

high-quality, fine-tip, disposable drafting pens.

The operator panel looks straightforward, but the DMP-51/52 is actually a highly sophisticated machine that needs a

large number of control sequences and combinations to set it up. Default conditions can be changed and permanently saved into nonvolatile RAM. A menu mode prints the long list of options, with

choices made by moving the pen head with the control keys. This elegant system eliminates the need for any DIP switches. The serial interface is easy to configure, and the documentation does a decent job of ex-

Out of the Office and into the Studio

Fine artists use PCs, plotters, and their own programs to create the right image.

The plotters reviewed in this issue of *PC Magazine* are business tools. Professionals use them to create presentation visuals: the charts, graphs, tables, and diagrams that illustrate a hundred thousand projections and distributions, upside potentials, and downside realities.

We continue to be intrigued, however, by the fine-art possibilities of these machines. This is not a new subject for

us; back in April 1983 we busted our four-color budget with a feature pictorial on the work of Mark Wilson, whose work is featured again on this page. And next fall we're looking forward to exhibiting in the magazine the personal-computer art of six prominent American artists. Given our long-standing interest, we didn't want to miss this opportunity to see what Mark has been up to lately. Joining Wilson's work on this page is a

sample of the work of Colette and Charles Bangert of Lawrence, Kansas.

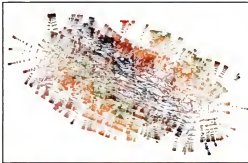
In her correspondence, Colette Bangert writes, "Someday, plotters and their computers will be as direct yet as subtle as painting brushes, which have evolved over centuries." The Bangerts have been exhibiting together since 1970, when they took first prize at the National Conference of the Association of Computing Machinery's Exhibition of Computer Art



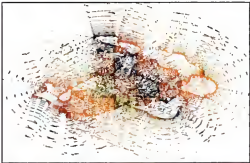
Skew J17, by Mark Wilson



Skew F19, by Mark Wilson



Circe: Colored Line Study, by Colette and Charles Bangert



Circe: Colored Line Study, by Colette and Charles Bangert

plaining the numerous options, including the complete DMPL command set.

While these bells and whistles are fine, the real delight in using the DMP-51/52 is watching it work. It is fast and accurate.

in New York. To create plotted drawings, they have used equipment ranging from a Honeywell 635 mainframe to an IBM PC. The pair of delicate drawings shown here, titled *Circe: Colored Line Study*, was plotted on an HP 7475 plotter driven by a PC configured with 640K bytes of RAM, an 896K-byte RAM disk on a Tall Tree JRAM-2 board, and two 10-megabyte hard disks in an IBM expansion unit. The Bangerts and Wilson write their own programs; their programs are their art.

Basic Art

Mark Wilson of West Cornwall, Connecticut, is a painter who abandoned traditional fine-arts techniques after first using a computer in 1980. To create the bold, colorful drawings shown here, *Skew J17* and *Skew F19*, Wilson used a two-part procedure for which he wrote one BASIC program to generate and repeat the image and another BASIC program—essentially a screen dump—to map the image, pixel by pixel, on paper. The artist used an IBM PCjr with 128K bytes of RAM to drive a Tektronix 4663 pen plotter.—Barry Owen

Excerpted from an article in the British art magazine Leonardo, 1974 Volume 7.

Charles Bangert: *I've just thought of an interesting piece of code that might draw pictures.*

Colette Bangert: *What will the pictures look like?*

Charles Bangert: *I'm not sure, maybe like this.*

Colette Bangert: *That line's not too well placed there.*

Charles Bangert: *Well, maybe I'll think of a different code tomorrow.*



Nicolet Zeta 8

The 51/52 scored among the fastest plotters on both benchmark tests. Equally important was the crispness and clarity of its output. The very good pens help, but the basic mechanical excellence of the plotter is unmistakable. The internal ROM font is also first rate.

Over the years I have not been particularly impressed with HI's low-end products (the PC-595/695, the DMP-29, and the DMP-41/42), especially in terms of their accuracy. The DMP-51/52, however, is another matter entirely: very high quality, fast, and accurate plotting at an extremely reasonable price. ■

Nicolet Zeta 8

Nicolet is probably the least-recognized name in the personal computer market. In the minicomputer and mainframe arenas, though, the firm has earned an enviable reputation for building workhorse plotters with high performance.

Nicolet also markets a \$995 plotter known as the Sprint, based on the Enter Six Shooter, but for these reviews PC

Magazine Labs chose the company's Zeta 8 desktop plotter. This rock-solid, yet refined plotter offers exceptional performance in almost every respect.

The Zeta 8 is a printerlike unit that uses paper or film with sprocket holes on the edges. It can use both fanfold and roll paper, so automatic media feed is standard. The media feeds easily through the rear of the plotter, and Nicolet offers a broad selection of paper, vellum, and film. A straight-line carrier that snaps into the head, holds eight pens, which all move together. The pens sit in a rubber cap that prevents drying; in use, the pen tip is actually pushed through the end of the cap for plotting—an ingenious design that seems to work well. An unusually varied assortment of pens is available, including disposable and refillable liquid ink, wide and fine nylon fiber tips, liquid roller pens, and more.

Nicolet has its own proprietary command language, which is unusually flexible and even features error correction of the incoming data under certain circumstances. The Hewlett Packard Graphics Language (HPGL) is an option. The unit offers such advanced features as proportional printing, paper-out sensing, optional protocol converters for IBM 2780, 3780,

Fancy Font
Social Invitations
Лучшая Diplomas
¡Español! Fancy Font
Clean handwritten COMPUTE
Dot Matrix Printing
Made Beautiful

\$ Now Laser!

This entire ad, from top to bottom, was printed on an inexpensive dot matrix printer with Fancy Font,[®] a unique program that works with almost any word processor to produce high resolution, proportionally spaced, letter quality printing.

No special hardware or installation is required, so you'll be using Fancy Font as soon as you get it.

Fonts, including Roman, Sans Serif, Bold, Italic, Script, Old English and more, from 8 to 24 points come standard with Fancy Font.

FLEXIBLE. Fancy Font comes with a complete set of over 1500 mathematical, foreign language and other special symbols.

Hundreds of additional fonts in sizes from 6 to 72 points are available, at a nominal additional charge, from our growing font library.

You can edit any character and also create your own characters or logos, up to 1 inch by 1 inch.

Powerful formatting features let you center, justify, wordwrap and type flush left or right, with or without running headers and footers — even with different fonts and sizes on the same line.

IMPACT YOUR LASER. Combine the high quality of the HP LaserJet, LaserJet+ or Canon Laser printer with the font styles and sizes of Fancy Font for the ultimate in visual impact.

You can mix internal printer fonts, cartridge fonts and Fancy Font letters on the same line to create materials with typographic impact.

COST EFFECTIVE. You can buy Fancy Font from your local dealer or direct from SoftCraft for only \$180.

You'll get near typeset quality at a small fraction of the time and cost of using art or typesetting services.

You'll be turning out beautiful reports, newsletters, presentations, letters, mathematical texts, overheads, invitations and more after getting your copy of Fancy Font. The applications are limited only by your imagination.

Fancy Font runs on PC-DOS, MS-DOS and CP/M systems with Epson, Toshiba and compatible dot matrix printers and laser printers.

Call or write now to order Fancy Font or ask for complete information including actual samples and independent reviews.

CALL TODAY 1-800-351-0500

MasterCharge and Visa accepted

SoftCraft, Inc.

222 State Street, Madison, WI 53703 (608) 257-3300

PLOTTERS

and SNA/SDLC, pen pressure adjustment, and many others.

The operator panel is both functional and entertaining. A plethora of LEDs makes a pleasant light show as the Zeta 8 goes about its business. Traditional switches configure the unit to a wide variety of operating environments. Interfacing the Zeta 8 required a bit of experimentation, but the comprehensive documenta-

The performance of the Zeta 8 was generally superb. Plot quality was simply wonderful.

tion helped greatly.

The performance of the Zeta 8 was generally superb. Plot quality was simply wonderful—accuracy was excellent, diagonal lines were straight despite the speed, the internal text font was lovely—and the plotter cranked out our hardware font benchmark in record time. Nicolet included narrow and wide fiber-tip pens as well as liquid-ink pens, and each type was excellent. The Zeta 8 was also exceptionally quiet, emitting a muffled clicking reminiscent of a very well-shielded wire service machine.

With the exception of an occasional paper jam when roll paper was fed at a high speed, the Zeta 8 worked flawlessly. Admiring its tanklike construction combined with silky smoothness, I could easily imagine the plotter operating with similar panache for years and years. In Hollywood it's a compliment to say that a movie's production cost "is all on the screen"—the money wasn't wasted on invisible expenses. The Zeta 8 is not inexpensive for a B-size plotter, but you can see where the money goes. ■

PC FONT FILE

Zeta 8
Nicolet Computer Graphics Division
777 Arnold Dr.
Martinez, CA 94553
(415) 372-7568
List Price: \$5,950

CIRCLE 691 ON READER SERVICE CARD

Princeton Graphic Systems Number One Again

Sharp resolution, full compatibility, and rugged reliability. That's what you get in every Princeton Graphic Systems monitor. That's why Princeton Graphic Systems is number one in the minds of more and more personal computer owners every year.

Only Princeton Graphic Systems offers a complete family of quality personal computer

displays. Our color and monochrome monitors outperform the competition every time. That's why, for the second year in a row, our HX-12 high resolution color monitor has been voted best in the world.*

So for the very best in personal computer monitors, pick the company that's number one. Princeton Graphic Systems.

*PC WORLD Magazine's 1985 World Class Survey.



PRINCETON®

GRAPHIC SYSTEMS
AN INTELLIGENT SYSTEMS COMPANY

601 Ewing Street, Bldg. A, Princeton, NJ 08540, (609) 683-1660, Telex: 821402 PQSPNN, (800) 221-1490 Ext. 702

CIRCLE 199 ON READER SERVICE CARD

Multiple Host Sessions—Up To 7 Combinations of Displays and Printers—Simultaneously (Available Only On AST-525/11 Plus)



Multiple Printer Sessions, Including 5256, 5224 and 5225 Emulation On PC-attached Printer

Programmable Printer Format Configuration



Bidirectional File Transfer



Automatic Sign-On With Password Security



Display Attribute Configuration



Build Your Smart Office The Smart Connection™ For

Loaded with the sophisticated features you need, we've just made our original AST-525/11 even easier to use and more efficient for increased user productivity, and introduced an enhanced version too—AST-525/11 Plus. Now you have lots of new reasons to make AST "The Smart Connection" for your evolving smart office.

Office Smarts—We've Got Them. At AST we've been building solutions for IBM® PC connectivity—the foundations of smart offices everywhere—long before it was a popular concept. You might say, with the over one million AST PC enhancements installed, over 20,000 PC to System 34/36/38 connections and the thousands and thousands of PC to IBM mainframe and local area

network gateway connections we've established worldwide, that we've already made a substantial commitment to helping people realize their fundamental visions of the "smart office."

AST-525/11—The Direct PC To 34/36/38 Connection. Standard twinax cable, just like IBM's, makes this connection the most convenient for you. Our Hot-Key support provides a toggle between PC DOS and two host sessions. And our new enhanced version, AST-525/11 Plus, even allows up to seven System 34/36/38 sessions—all concurrently.

AST's family of smart connections are strategically focused and developed to support and evolve in concert with the IBM Smart Office architecture. Highlighting the mini-computer group here, AST also addresses connectivity in mainframe and personal workstation environments.

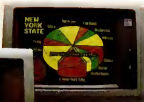


Our file transfer system means you can move host data to and from your favorite PC application software files, like Lotus 1-2-3®, WordStar® and dBASE®. For easy integration of PC and host applications, we've included our Applications Program Interface (API).

Add all our features illustrated above—everything from bidirectional file transfer to automatic 34/36/38 sign-on with password security, multiple printer support including 5256, 5224 and 5225, snapshot display storage, keyboard mapping help, and a full line of companion products—and AST-525/11 really spells smart for you.

AST-5250/Display™—Model 11 Attributes and Standard IBM PC Monochrome Display Capabilities. Used with your AST-525/11 card, the AST-5250/Display makes your PC's

AST-5250/Display
Products For Full Model 11
Display Attributes And PC
Compatible Graphics



User Definable
Keyboard Mapping



Displayable Keyboard Map
of Program Control Keys



Display Snapshot
Storage Buffer



Proven In More Than 20,000 Direct And Remote
PC to System 34/36/38 Connections Worldwide

20,000

Even More Features

- AST-5250/11 Plus or AST-5251/11
 - Plugs into PC XT/AT and compatibles, connects to System 34/36/38 via monochrome cable and supports cable thru
 - Emulates 5250-11, 5291 or 5292-1 display terminal
 - Upgrade kit for AST-5250/11 to AST-5251/11 Plus
 - Selectable DMA and I/O interrupt channels
 - Applications Program Interface (API) included
 - Supports fixed or hard disk
 - Hot-key assist for concurrent PC and multiple host sessions
 - IBM PS/2 compatibility (no virtual disk support on the system 34/36/38)
 - Third Party Software support, including ASLink by Fusion,² Laguna Laboratories' DecusLink³ and The ROM⁴ by ToolMan Systems
 - Complete package includes hardware, software, remote cable assembly & user manuals
- AST-5250/Display
 - Used with AST-5251/11 brings full IBM 5251 Model 11 character and text display attributes to your IBM monochrome display
 - Provides standard IBM PC &
- IBM 5251/11 monochrome display capabilities & a parallel printer port
 - Hercules compatible high-on bit-mapped graphics interface
 - Automatically switches from 5250/11 display to PC display mode without operator interaction
- AST-5250/Display-C
 - Used with AST-5251/11 brings IBM 5292 Model 1 display attributes to your PC's color display
 - Provides compatibility with IBM PC Color Graphics Adapter with full-spectrum color capabilities
 - Includes parallel port
 - Automatically switches from 5292 Model 1 display to PC display mode without operator interaction
- AST-5251/12
 - A full solution for remote PC/XT/AT/Portable or compatible to System 34/36/38 communications in SNA environments
 - PC emulation for IBM 5250 Model 12 terminal
 - Host-addressable 5254 printer support on PC-attached printer
 - Applications Program Interface (API) allows integration between host and PC applications
 - Includes hardware, software and comprehensive user documentation

On AST-5251/11:TM Your PC to System 34/36/38

monochrome display look just like an IBM Model 11 display.

And it gives you high-resolution HerculesTM compatible bit-mapped graphics, high quality text and a parallel port.

Now PC 5251/11 emulation is even easier for you because you're working with a screen identical to IBM's. And you can take advantage of the graphics capabilities offered by today's software.

AST-5250/Display-C™—IBM 5292 Color Attributes and Standard IBM PC Color Graphics Too. Use this card with your AST-5251/11 and your IBM color monitor for all of IBM's 5292 screen text attributes. And

some really colorful PC graphics.

Our color capabilities are completely compatible with your PC software favorites like Framework,⁵ Symphony,⁶ Lotus 1-2-3,⁷ Business Graphics Systems⁸ and DESQview.⁹ There's also a parallel port to make printer and plotter connection easy and convenient.

AST-5251/12™—Remote PC to 34/36/38 Connections. For remote communications in SNA/SDLC environments, this complete hardware/software package lets you use your PC as a remote 5251 Model 12 terminal, and your attached PC printer is host-addressable to emulate a 5256 printer. Our Applications Program Interface also makes

integrating host and PC applications easy.

You can count on The Smart Connection—from AST—today and in the future. See your dealer, or call our Customer Information Center (714) 863-1333 for more information. AST Research, Inc., 2121 Alton Avenue, Irvine, CA 92714 (714) 863-1333 TWX: 753699 ASTR UR.

**AST
RESEARCH INC.**



See Us At
Comdex/Fall '85
Booth #1782

AST-5251/11, AST-5251/11 Plus, The Smart Connection, AST-5250/Display, AST-5250/Display-C and AST-5251/12 trademarks of AST Research, Inc. IBM registered trademark of International Business Machines Corp. MicroStar registered trademark of MicroPro International Corp. Lotus and 1-2-3 registered trademarks and Symphony trademarks of Lotus Development Corp. dBase and Framework trademarks of Ashton-Tate. See also trademarks of Hercules Computer Technology. Fusion registered trademark of Fusion Products International. DecusLink trademark of Laguna Laboratories, Inc. The ROM registered trademark of ToolMan Systems, Inc. Business Graphics Systems trademark of Pro-View Software, Inc. DESQview trademark of Quantum's Office Systems. AST-5251/12 is a product developed by AST Research, Inc. and Software Systems, Inc. of Jefferson City, MO, and is protected under U.S. Copyright Laws.

CIRCLE 101 ON READER SERVICE CARD



ONLY CHART-MASTER

CHART-MASTER® is #1—again.

For the second consecutive year, we've been rated the top business graphics program by *Software Digest*, the "Consumer Reports" of the software industry.

What does it take to be #1? Plenty.

We had to beat a field of 16 heavy competitors, including Lotus 1-2-3,™ Graphwriter,™ Microsoft Chart,™ and a dozen others.

And we had to score better than anyone else in a total of five comparative ratings to do it.

In printed and plotted graphs, we were judged "excellent."

Our user's manual, term definitions, and on-screen instructions were praised for their extraordinary clarity.

And our ease of data access and use scored higher than any other program.

How to choose between powerful and easy to use.

Software Digest recommends you decide which of their ratings are most important to you before consulting their head-to-head comparisons.

What if you can't decide between a graphics program that's easy to learn, easy to use, easy to change and fast, versatile, and able to produce picture perfect graphics?

Easy. Choose CHART-

SOFTWARE DIGEST RATING OVERALL EVALUATION	PROGRAM NAME	VERSION TESTED	PRICE OF SOFTWARE	MINIMUM HARDWARE REQUIREMENTS	PRICE	OVERALL RATING	PAGE
*** 9.3	Chart-Master	Pre 6.1	192K	\$375	26		
*** 7.6		1.00	192K	\$295	28		
*** 7.4		4.3	192K	\$595	42		
*** 7.3		1.3	128K	\$350	32		
*** 6.6		8.00	128K	\$140	52		
** 8.6		Rel 2	96K	\$395	56		
** 6.7		3.0	128K	\$375	48		
** 6.5		5.0	192K	\$85	36		
** 6.4		1.01	128K	\$250	48		
** 6.2		1.00/1.03	512K	\$295	44		
** 6.0		1.02	128K	\$295	24		
** 5.5		3.27	128K	\$450	36		
** 5.2		1A	192K	\$495	50		
** 5.1		Pre 2.0	256K	\$395	54		
4.9		1.0	256K	\$200	40		
4.5		2.2	320K	\$795	34		
3.4		2.00	128K	\$295	30		

Ratings Key
(On a scale of 0 to 10. For methodology, see Page 98.)

OVERALL EVALUATION
 ***** 9.0 or higher
 **** 8.0-8.9
 *** 7.0-7.9
 ** 6.0-6.9
 * 5.0-5.9

ALL OTHER RATINGS
 ■ 7.0-7.9
 ■ 6.0-6.9
 ■ under 5.0

Reprinted with permission by *Software Digest*® Ratings Newsletter, July, 1985 issue.



CAN MAKE THIS CLAIM.

MASTER, the graphics software that received the highest rating for both power and ease of use.

What the new version CHART-MASTER 6.1 brings to the picture.

Decision Resources now offers IBM PC users expanded graphics capabilities with the new CHART-MASTER 6.1.

- Our DataGrabber™ allows you to pull selected spreadsheet or data base files into a chart quickly and easily.
- Two new text fonts give you a choice of Helvetica™-like type in Swiss and Swiss Bold.
- A new symbol font gives you 94 business symbols and icons to draw from.
- And more—network compatibility, support for over 90 plotters and printers, floppy-less hard disc support, mixed charts—and more. Much more.

If you currently have a version that's earlier than

CHART-MASTER 6.1 or SIGN-MASTER™ 5.1, call Decision Resources for information on how to receive an updated copy.

A total graphics package.

CHART-MASTER stands alone among its competition, but it doesn't stand alone at Decision Resources. It's part of a complete business graphics package. For text, try SIGN-MASTER. For organization and Gantt charts and a free-form Drawing Board, try DIAGRAM-MASTER™.

All three programs give you the ideal power and usability to help you solve your business graphics needs.

How to get your free copy of the *Software Digest* report.

For the name of the nearest dealer who can give you a demonstration of CHART-MASTER, please call us at (203) 222-1974.

If you'd first like to see the evidence for yourself, send in the coupon below. We'll send you a copy of the July 1985 issue of *Software Digest*, which evaluates and ranks the industry's 17 top business graphics software—at no cost.

When it comes to choosing the best graphics software for your business, we think you should feel free to be the judge.

Decision Resources, Inc.
25 Sylvan Road South
Westport, CT 06880

Please send me the July 1985 issue of *Software Digest*. I'd like to see for myself.

Name

Title

Company

Address

City

State Zip

Phone



PCMA

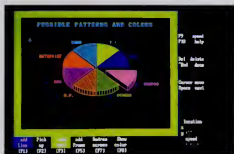
DecisionResources
Software Designed for Decision Makers

INTRODUCING **ENERCHARTS™** EASILY...THE BEST!

It's New! It's the Best! **ENERCHARTS** is for those who want the best in business presentation graphics. **ENERCHARTS**, created by the developers of **ENERGRAPHICS**, gives you the ease of use and capabilities that keeps you a step ahead of the rest. Here's how!

New ease-of-use features

- **On-Screen Customizing**—Customize your graphs easily on-screen with text, color, sizing, overlays and many other features. Make Lotus Graphs look great.
- **One-Menu Selection**—Create Pie, Bar, Line and Text Charts with one menu selection.
- **Help Screens**—Get help anywhere in the program with over 100 + help screens available.



New features

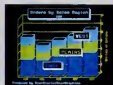
Now all in one package you have the capability to create and customize graphs for presentation, analysis and planning. Here's just a few examples.



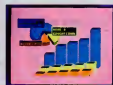
Chart-It



Plan-It



Organize-It



Combine-It



Merge-It



Plot-It



Write-It

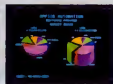


Chart-It

Easy Interfaces

- Lotus 1,2,3, Multiplan, DIF or WKS Files
- Video Show
- Polaroid Palette
- Interface to mainframe graphics through **ENERCONNECT**
- Interface to Wordprocessing through **ENERMERGE**

Ordering

As with all our fine products **ENERCHARTS** outputs to all popular printers and plotters. Call your dealer today to order.

ENERCHARTS—Retail Price \$395.00. Call or write for a brochure today and see why we say **ENERCHARTS**—Is Easily...The Best!
1-800-325-0174. **COMDEX Booth H7833**

ENERTRONICS

SEEING IS BELIEVING

Enertronics Research, Inc. • 150 N. Meramec • St. Louis, MO 63105 • (314) 725-5566

GENOA AND PARADISE: A Superset of Graphics Standards

When it comes to choosing a personal computer display, your options are dismal. You can opt for the official IBM monochrome display adapter, but it locks you into the not-too-exciting world of text-only displays or clunky block graphics. Or choose an IBM Color/Graphics Adapter, which lets you make pretty pictures, but you can strain your eyes to near blindness trying to read its substandard text. Or hold out for IBM's admittedly good enhanced display and its matching adapter, but the price of your system will double. The final alternative—two adapters and two screens—swallows expansion slots and desk space, not to mention your personal assets.

If none of these alternatives appeal to you, take heart. Thanks to several manufacturers that have turned their talents to improving the dismal display situation, you now have one more option: alternative monitor adapters with their own matching display standards. With their novel creations, you can make your display do nearly anything you want—that is, if you don't mind occasionally abandoning the official IBM display standards for extra detail and effects. For instance, if you want to put graphics on your IBM monochrome screen, you only need to forego the official IBM display adapter and choose one that has that particular ability.

These two adapters, the Genoa Spectrum Color/Mono/Graphics Board from Genoa Systems Corp. and the Modular Graphics Card (MGC) from Paradise Systems Inc., aim to be the ultimates in alternative display adapters. Each one starts with exact IBM compatibility for both

Two alternative display adapters offer high-quality color and monochrome graphics while maintaining true IBM compatibility.



ALTERNATIVE DISPLAY ADAPTERS

monochrome and RGB color displays and then further embellishes that foundation with its own special features and abilities. Although neither product aspires to replicate the high-resolution color displays of the IBM enhanced graphics system, both will put graphics on your monochrome screen and eliminate the annoying flicker that accompanies the scrolling of the standard IBM color screen.

That's about all this twosome has in common. They differ markedly in both technical specifics, such as how they paint pictures in green, and general design goals. The Spectrum sets out to be the ultimate (unenhanced) display adapter, embracing the most prevalent non-IBM enhanced display standards and its own extended text-displaying abilities. The Paradise MGC is an evolutionary refinement on the IBM standard that cleverly folds color graphics into monochrome. At the same time, it serves as a foundation for enhancing PCs and XT's with additional memory as well as a battery-backed-up clock.

Choosing between the two boards amounts to a features slugout. (See accompanying table, "How They Stack Up".) You'll have to compare what you need to what they promise and deliver. Here's a look at each one.

A Many-Shaded Spectrum

The Genoa Spectrum starts with all the standard IBM display modes and then goes them all at least one better by following the alternative standards favored by the PC in-

dustry. It starts by reworking ordinary PC graphics abilities into monochrome. Then, for high-resolution graphics on monochrome displays, it emulates the Hercules Graphics Board and is compatible with the numerous program packages, including 1-2-3 and Digital Research's GEM, that have chosen that standard for nontext monochrome images. For better-than-ordinary PC color, the Spectrum follows the Plantronics standard, adding three (to total four altogether, including black and white) extra colors to its highest-resolution (640-by-200-dot) graphics mode and giving a full 16 colors in medium-resolution (320-by-200-dot) mode.

Beyond these widely accepted standards, the Spectrum throws in a trio of extended text modes: 132 rows by 25 lines or 132 rows by 44 lines in monochrome and 132 rows by 25 lines in color. In addition to the display functions, the Spectrum also includes a parallel printer port and a light pen adapter.

The same component-packed, full-length Spectrum card works for both versions of the IBM display, RGB color or green-screen monochrome. Although a single card will handle only one monitor at a time, the control software makes a provision for switching monitors as necessary and warns you when to unplug one display and plug in the other.

When you install the Spectrum, you flip the DIP switches inside your PC system unit (or configure your AT during the setup procedure) to indicate that you have an 80-column color display, no matter what sort of monitor you actually plan to use. You select the actual monitor type that the Spectrum expects to control by setting a jumper near the bottom of the card.

In addition to the jumper that allows for monitor-type setting, another jumper hides the parallel port from or reveals it to your PC (should you have another printer port at the same address). Although this feature may be helpful, making the port address selectable as LPT1, LPT2, or LPT3 would have been more useful.

A third jumper allows you to choose blinking or flicker-free nonblinking scrolling on your color display. The blinking mode is identical in operation to the IBM Color/Graphics Adapter—which means it's bothersome and slow. Whenever the

How They Stack Up

	Genoa Spectrum	Paradise MGC
With monochrome monitor text (rows x cols.)		
25 x 40	yes	yes
25 x 80	yes	yes
25 x 132	yes	no
44 x 132	yes	no
graphics		
IBM compatible	yes	yes
Hercules compatible	yes	no
With RGB color monitor text (rows x cols.)		
25 x 40	yes	yes
25 x 80	yes	yes
25 x 132	yes	no
graphics		
IBM compatible	yes	yes
Plantronics compatible	yes	no
Compatible with composite monitor		
	no	yes
Printer port		
	yes	no
Memory and clock expandability		
	no	yes

screen must scroll upward or downward for a single line or more, the adapter blanks the display (to avoid a showing of snow) for the amount of time the display memory takes to update, resulting in a blink. The nonblinking mode on the Spectrum prevents blackouts. On my AT-compatible system, no snow was apparent when I used this mode.

The nonblinking mode also makes the screen seem to update faster. (I had stopped using color for my daily work because of the flicker and because it was noticeably slower than monochrome.) Upon investigation, however, the speedy effect proved to be subjective. When I timed a screen-intensive task in blinking and nonblinking modes, the results were identical.

Although eye-pleasing, the nonblinking mode has its negative side, too. Some programs may not work properly in the nonblinking mode. In particular, screen-saving software—the stuff that blanks your screen if you don't touch your keyboard for several minutes so that you don't etch anything into the phosphors of your display—won't work in the nonblinking mode.

The instruction manual includes a brief

PC-A-FILE

Genoa Spectrum Color/Mono/Graphics Board
Genoa Systems Corp.
73 E. Trimble Rd.
San Jose, CA 95131
(408) 945-9270
List Price: \$459

CIRCLE 647 ON READER SERVICE CARD

Modular Graphics Card

Paradise Systems Inc.
217 E. Grand Ave.
South San Francisco, CA 94080
(415) 588-6000
List Price: \$395; optional parallel port module, \$95; serial port module, \$95; 256K RAM, \$195; multi-function module, \$299

CIRCLE 648 ON READER SERVICE CARD

run-through of the functions of the various jumpers on the card and a listing of typical system configurations and associated jumper settings, but the normal setting is shown in an appendix rather than the installation instructions. Some space is devoted to adapting three favored commercial software packages—*WordStar*, *1-2-3*, and *Multiplan*—to the extended text modes. A large central section is devoted to assembly language-level manipulation of the Spectrum hardware.

Outside of an occasional misprint and a few proofreader's errors—one of which indicates an impossible jumper setting (you are advised to connect pin 1 to pin 2, which would not be a problem if pin 3 weren't located between the two pins)—the instructions are clear and commendably concise.

Unwilling Display Partners

While the engineers who developed the Spectrum made it as compatible as possible with non-IBM standard display software, they paid scant attention to hardware that does not bear the Big Blue logo. The only concessions that they make to non-IBM displays are a list of the monitors that will work properly with it (the Princeton Graphics Systems MAX-12 and HX-12, the Taxan 420 and 425, and the Quimax PX-IV) and a quick outline of the problems that a few monochrome models (the Amdek 310A, the Quimax DM-14, and the Taxan 121) might have when working with the board.

For instance, they advise you that Amdek 310A monitors (one of my favorites) have to be switched off and on after you change display modes. My experience confirms that advice. Even using screen instructions in BASIC obliged me to execute the off-and-on ritual to see what was going on. Moreover, I learned that turning your system on constitutes changing display modes; I had to flick the power switch of my 310A to get a picture after powering up.

Having to toy with the monitor for every mode change is bothersome. No doubt the Spectrum engineers will pin the blame for my problems on the Amdek design. The problem is Genoa's, however—and yours if you try to mate that monitor to the Spectrum. Other manufacturers, in partic-

ular Paradise, have found ways of avoiding such difficulties.

The adapter-to-monitor connection is more critical than you might think. Some monitors seem more sensitive to the signals they receive than others. My official IBM Personal Computer Color Display worked flawlessly with the Spectrum—except in the color tiny-text mode—despite having an extra 16 feet of connecting cable. Removing the extra cable cleared up the problems with small characters. A Roland color monitor, however, made the top text line appear in backward italic (a problem video engineering might call tearing).

Switch-Hitting Software

A single disk of software accompanies the Spectrum. The one important program, called SM, was both a pleasure and a pain to use. It does exactly what it is supposed to. Type SM and you get a menu from which to select the display mode of the Spectrum. Or, once you know what the numbers on the menu stand for, you only need type SM and the appropriate number, and the program works just like a DOS command.

Its shortcomings lie not with the program itself, but with those inherent to the Spectrum system. Although SM is commendable in that it does not seem to alter DOS and the IBM BIOS in any way (such as capturing or changing video interrupts)—a strong feature that assures compatibility—the program does not help your PC deal with the strange new video modes it switches you into.

For instance, if you switch to the 132-column by 44-row video mode, you have row upon row of truly tiny text. Alas, the BIOS of the PC is still set for 80 columns by 25 rows. Pieces of text are apt to be left all over the screen. Even the CLS command will not give you a clean slate.

Despite such shortcomings, the tiny-text modes can be useful, particularly in that the Spectrum instructions tell how to patch *WordStar* for using them and that a software driver for 1-2-3 is included so that your spreadsheets can spread out.

I found no other problems with any of the emulation modes of the Spectrum. All the standard monochrome and color IBM modes worked just like the official IBM products—in a word, ho hum.

(continued on page 157)



The Paradise Modular Graphics Card rates as highly compatible with self-booting software, passing the *Flight Simulator* test with flying colors—in monochrome, of course.

It was a dark and stormy night.

The rain crashed against the plate glass windows harder than an errant drive-head on a search and destroy mission.

✓ denotes IBM-AT compatibility.

SOFTWARE

We only carry the latest versions of products. Version numbers in our ads are current at press time.

Alpha Software

✓Keyworks	\$49.
✓DataBase Manager II 2.02	169.
✓Electric Desk 1.1 (w/Keyworks)	195.

Ashton-Tate

✓dBase II 2.43	call
✓dBase III 1.1	call
✓Framework II	call

Best Programs

PC Connection 15-day money back guarantee on these Best Programs.

✓PC/Tax Cut (1985 version for 1984 taxes)	49.
✓PC/Tax Cut (1985 version for 1985 taxes)	124.
✓Personnel Series Level I	279.
✓Personnel Series Level II	419.
✓Personnel Series Level III	559.
✓Personal Finance Program 2.0	65.
✓Professional Finance Program 3.0	149.
✓PC/Fixed Asset System 3.0	329.

Bible Research

✓THE WORD 3.0 (KJV Bible)	145.
✓THE WORD 3.0 (NIV Bible)	145.

Borland International

✓Turbo Tutor 1.0	19.
✓Turbo Database Toolbox 1.1	30.
✓Turbo Graphics Toolbox 1.0	30.
✓Turbo Editor Toolbox 1.0	37.
✓Turbo Gameworks 1.0	37.
✓Turbo Newpak (Gameworks and Editor)	52.
✓Turbo Lightning 1.0 (w/spelling dictionary and thesaurus)	call

✓Sidekick 1.5 (copy-protected)	30.
✓Sidekick 1.5 (non-protected)	48.
✓Reflex 1.0	57.
✓Superkey 1.1	37.
✓Superkey/Sidekick Package (includes \$15 rebate coupon from Borland)	67.

✓Turbo Pascal 3.0	37.
✓Turbo Pascal 3.0 w/BCD	59.
✓Turbo 8087 3.0	59.
✓Turbo 8087 3.0 w/BCD	72.
✓Turbo Holiday Pak (Pascal 3.0, Tutor, and Database Toolbox)	67.
✓Turbo Holiday Jumbo Pak (Pascal 3.0, Database, Editor & Graphics Toolboxes and Gameworks)	139.

PC Connection Software Special

through December 31, 1985

INDIVIDUAL SOFTWARE

✓Lotus 1-2-3 and dBase III Training

State-of-the-art training packages that have you PRACTICE software applications, rather than just watch. Designed for users of all ability levels.

• LOTUS 1-2-3

Practice worksheet editing, database and graphic operations, using windows, creating macros, and performing "what if" analyses with data tables.

• DBASE III

Comprehensive lessons on organizing and creating a data file, commands, viewing and searching information, designing and generating reports.

each \$39.

BPI Accounting Software

✓General Ledger C.13	289.
✓Accounts Payable C.13	289.
✓Accounts Receivable C.13	289.
✓Business Builder (G/L, A/R, A/P, Payroll, information management, spreadsheet, business graphics and word processing)	399.

Breakthrough

✓Timeline 2.0	249.
---------------	------

Broderbund

✓Bank Street Writer	49.
✓Print Shop	35.
✓Graphics Library #1	22.

Conceptual Instruments

✓The Desk Organizer 2.0	59.
-------------------------	-----

Connecticut Software

✓Sideline 5.0	37.
✓Printer Boss 5.0	99.

Dac Software

✓Dac Easy Accounting 1.0	45.
--------------------------	-----

Decision Resources

✓Chart-Master 6.1	237.
✓Diagram-Master 5.0	207.
✓Sign-Master 5.1	157.

Digital Research

✓GEM Desktop 1.1	30.
✓GEM Draw 1.0 (includes Desktop)	93.
✓GEM Collection 1.0 (includes Desktop, Paint and Write)	119.

Dow Jones

✓Market Manager +	\$145.
✓Spreadsheet Link	145.
✓Membership Kit	19.

Enertronics

✓Energraphics 1.3	165.
-------------------	------

Evergreen

✓One Write Plus 1.0	169.
---------------------	------

Financial Software

✓Financier II 2.1	59.
-------------------	-----

Friendlysoft

✓Friendly Writer 3.2 (w/Friendly Speller)	55.
---	-----

Funk Software

✓Sideways 3.0	37.
---------------	-----

Graphic Communications

✓Graphwriter Combo Set	305.
✓Freelance	189.

Harvard Associates

✓PC LOGO 2.0	89.
--------------	-----

Harvard Software

✓Harvard Project Manager 1.16	209.
✓Harvard Total Project Manager 1.0	279.

Human Edge

✓Mind Probe	27.
-------------	-----

IMSI

✓PC Paintbrush 2.8	35.
--------------------	-----

Infocom

✓Cornerstone 1.0	279.
------------------	------

Litetype

✓Vokswriter 3 (w/TextMerge)	159.
✓Vokswriter Scientific 1.0	289.

Living Videotext

✓ThinkTank 2.0	109.
----------------	------

Ready 1.0

✓Ready 1.0	49.
------------	-----

Micro Education (MECA)

✓Jim Fox Running Program 1.2	49.
------------------------------	-----

Managing Your Money 2.0

✓Managing Your Money 2.0	99.
--------------------------	-----

Micropro

✓Easy 1.0	97.
-----------	-----

✓WordStar 3.31	179.
----------------	------

✓WordStar Propak 3.31	259.
-----------------------	------

Hard disk recommended for Wordstar

2000 & Wordstar 2000 Plus	
---------------------------	--

✓WordStar 2000 1.01	259.
---------------------	------

✓WordStar 2000 Plus 1.01	299.
--------------------------	------

Microrim

✓Extended Report Writer 1.2	85.
-----------------------------	-----

✓Clout 2.0	135.
------------	------

✓R-base 5000 1.01	369.
-------------------	------

✓Upgrade Kit to R-base 5000	129.
-----------------------------	------

Microsoft

✓Multiplan 2.0	119.
----------------	------

✓Microsoft Word 2.01 (w/Ready)	call
--------------------------------	------

✓Microsoft Project 2.0	call
------------------------	------

✓Microsoft Chart 2.0	call
----------------------	------

PC CONNECTION®

On the 13th floor of headquarters,

a desperate vice-president struggled valiantly
to crunch his disastrous year-end figures
into the plus column.

The following Microsoft mice now
come with PC Paintbrush 3.0 software:

Microsoft Bus Mouse with software 5.0 \$135.
Microsoft Serial Mouse with software 5.0 135.

LANGUAGES

Quick Basic 1.0 69
Pascal Compiler 3.31 175
Fortran Compiler 3.31 205
Basic Interpreter 5.28 235
Basic Compiler 5.38 235
C Compiler 3.0 235
Business Basic Compiler 1.10 258

Microsoft

Crosstalk XVI 3.6 95
Remote 1.2 95
Infoscope 1.02 129
Transporter 1.3 (includes Crosstalk) 169

Multimate International

Just Write 1.0 79
MultiMate 3.31 call
MultiMate Advantage 3.5 call

Peter Norton

Norton Utilities 3.1 59
Nantucket Software
Clipper 349

Powerbase Systems

Powerbase 2.1 197
Quarterdeck
DesqVIEW 65

Resosoft

Prokey 4.0 89
Satellite Software
WordPerfect 4.1 239

Scarborough Systems

Your Personal Net Worth 1.1 59
Simon & Schuster
Webster's New World Speller 1.2 39

Software Digest

Ratings Newsletter
This publication is unparalleled for its
comprehensive, reliable evaluations. 1985's
issues evaluate the following programs: word
processors, file mgmt., database mgmt.,
spreadsheets, graphics, integrated acctg.,
project mgmt., communications, integrated
productivity.

Single copy 24.50
Year subscription 245.00

Softstyle

Printworks 1.05 39
Software Group
Enable 1.1 299

Software Publishing

PFS:ProFit B.00 59
PFS:Report B.01 77
PFS:Access A.00 84

PFS:File B.01 \$84.
PFS:Graph B.01 84
PFS:Plan A.01 84

PFS:Write C.00 (w/PFS:Proof) 84
First Success (Combo Pack includes PFS
Write, Proof, Plan, File) 229

Sorcim/US

SuperCalc 3.2 1 (w/Sideways) 199.
Spectrum Holobyte
Art Studio 32

Springboard

Newsroom 30.
Clip Art Volume 1 (for Newsroom) 19.

Unison

Art Gallery 1 22.
Printmaster 1.1 37.

United Software

Einsteintwriter 7.2 (w/coupon for free
Speller) 99
In-House Accountant 2.05 109

ASCII Pro 4.23

..... 69.
Xanaro
Ability 1.0 call

TRAINING

ATI

SKILL BUILDER PROGRAMS
Intro and How To Use:

Word Processing MS-DOS
Business Software PC-DOS
Data Bases Typing Tutor
Compaq BASIC

IBM-PC each 38.

TRAINING POWER PROGRAMS

How To Use:
dBase II dBaseIII Lotus 1-2-3

MS Word Supercalc 3 Multimate
Multiplan Wordstar Framework
Wordperfect Symphony Displaywrite 3

..... each 49

Friendlysoft

PC Intro Set 35.
INDIVIDUAL SOFTWARE

The Instructor II 35.
Professor DOS 47.

Tutorial Set (both items above) 75
Professor Pixel 47.

Typing Instructor 39

Training for Lotus 1-2-3 special
Training for dBase III special

Training for Project Management \$49.
Scarborough Systems
MasterType 26

Simon & Schuster

Typing Tutor III 33

EDUCATIONAL

Barron's

Computer SAT 59.
Designware

Spellcopter (ages 6 to adult) 25.
Mission Algebra (ages 13 to adult) 27.

European Nations (ages 9 to adult) 27.
Grammar Examiner (ages 9 to adult) 27.

States and Traits (ages 9 to adult) 27.
Digital Research

Diagnostic Test (PSAT) 14.
OwlCat SAT (15 hours) 63.

OwlCat SAT (60 hours) 169
Edware

Algebra 1 22.
Algebra 2 22.

Algebra 3 22
Harcourt Brace Jovanovich

Computer SAT 49
Computer GRE 57.

Scarborough Systems

Build-a-Book (ages 2 to 12) 19
Simon & Schuster

Lovejoy's SAT 39.
Spinmaker

All Spinmaker products now work with
DOS 2.x and 3.x.

Educational Games for Young Computer
Users. (All require graphics board)

Face Maker (ages 3 to 8) 18.
Kids on Keys (ages 3 to 9) 18

Fraction Fever (ages 7 to adult) 18.
Kinder Comp (ages 3 to 8) 18.

Alphabet Zoo (ages 3 to 8) 20.
Kidwriter (ages 6 to 10) 20.

Trains (ages 3 to 8) 20
Snooper Troops I (ages 10 to adult) 23.

Snooper Troops II (ages 10 to adult) 23.
In Search of the Most Amazing Thing
(ages 10 to adult) 23

Delta Drawing (ages 4 to adult) 27
President's Choice (ages 4 to adult) 27.

Springboard

Fraction Factory (ages 8 to 14) 19
Make A Match Math (ages 2 1/2 to 8) 19.

Piece of Cake Math (ages 7 to 13) 22.
Early Games for Young Children
(ages 2 1/2 to 6) 22.

1-800/243-8088

PC Connection

180M
6 Mill St., Marlow, NH 03456
603/446-3383

For the IBM-PC Exclusively.

PC CONNECTION®

"It's not a bad command!"

he screamed at his gasping micro.
But the PC refused his advances, no matter how he
pushed, pulled, or rebooted.

Springboard (continued)

Music Maestro (ages 4 to 10).....	\$22.
Easy As ABC (ages 3 to 6).....	24.
Stone (requires graphics board)	
Across the U.S.A. (ages 5 and up).....	22
My Letters, Numbers, Words (ages 1 to 5) ..	29
Kids Stuff (ages 3 to 8).....	29
Memory Master (ages 3 to 8).....	29
The Learning Company	
Addition Magician (ages 6 to 10).....	23.
Magic Spells (ages 6 to 10).....	23.
Word Spinner (ages 6 to 10).....	23.
Reeder Rabbit (ages 5 to 7).....	26.
Moptown Hotel (ages 8 to 13).....	26.
Number Stumper (ages 6 to 10).....	26.
Moptown Parade (ages 8 to 12).....	26.
Rocky's Boots (ages 9 and up).....	32.

RECREATIONAL

Blue Chip	
High finance simulations.	
Baron.....	32.
Millionaire.....	32.
Squire.....	32.
Tycoon.....	32.
Broderbund	
Championship Lode Runner.....	23.
Ancient Art of War.....	27.
CBS	
Murder By The Dozen (your turn, Sherlock).....	21.
Electronic Arts	
Pinball Construction Set.....	25.
Dr. J/Larry Bird One-on-One.....	28.
Music Construction Set.....	28.
Friendlysoft	
PC Arcade.....	35.
Funtastic	
Among the finest arcade style games available.	
Cosmic Crusader.....	27.
Snack Attack II.....	27.
Big Top.....	29.
Master Miner.....	29.
Hayden Software	
Sargon III (highest rated Chess program).....	35.
Infocom Difficulty levels shown in italics	
JUNIOR	
Seastalker.....	25.
STANDARD	
Enchanter.....	the Witness
Cuthroat.....	Planetfall
Wishbringer.....	Zork I
Hitchhiker's Guide.....	each 25.

ADVANCED

Zork II.....	Zork III	Infidel
Sorcerer.....	Suspect	
A Mind Forever Voyaging.....	each \$29.	

EXPERT

Deadline.....	Starcross	Suspended
Spellbreaker.....	each \$1.	

Invisiclues (hint booklets) are available for most Infocom games. Specify game... 6.

Microleague Sports

Microleague Baseball (you are the manager).....	25.
---	-----

Microprose

F-15 Strike Eagle.....	22
------------------------	----

Microsoft

Flight Simulator 2.12 (now works with Hercules Mono Card).....	32.
--	-----

1Step Software

Golf's Best (break 70 at Pinehurst No. 2).....	32.
Ultimate III.....	39.

Origin Systems

Bridge Parlor (the best Bridge simulation).....	49.
---	-----

PCSoftware

Championship Blackjack.....	23.
Chess 2001.....	27.
Armchair Quarterback.....	27.

Professional Software

Trivia Fever.....	22.
Trivie Fever II.....	15.
Super Sports Trivia.....	18.

SEGA

Spy Hunter.....	29.
Sierra On-Line	
Championship Boxing.....	24.

Sierra

Frogger.....	24.
Ulysses.....	24.
King's Quest.....	33.
King's Quest II.....	33.

Sir-Tech

Wizardry.....	42.
---------------	-----

Spectrum Holobyte

GATO.....	27.
-----------	-----

Sublogic

Night Mission Pinball.....	29.
Jet.....	33.

Six scenery (airport) disks are available for Jet—all western airports.....	each 15
---	---------

Telarium

Rendezvous with Rama.....	27.
Amazon.....	27.
Fahrenheit 451.....	27.

XOR

NFL Challenge (be the coach).....	\$79.
-----------------------------------	-------

HARDWARE

AST Research

All AST Boards come with a full one year warranty.

SixPakPlus 64k upgradeable to 384k, with clock calendar, serial & parallel ports & now includes Sidekick version 1.5 non-copy protected (game port optional).....	225.
---	------

384k (fully populated).....	239.
-----------------------------	------

MegaPlus II 64k upgradeable to 256k (or more with MegaPak) with clock calendar and serial port (parallel, game, or second serial port optional).....	249.
--	------

I/O Plus II with clock calendar and serial port (parallel, game, or second serial port optional).....	125.
---	------

Parallel, game, or second serial port for any AST board (specify board).....	35.
--	-----

AST-5251-11.....	579.
AST-3780.....	579.

Reach Modern half card 300/1200 baud internal modem includes Crosstalk XVI.....	349.
---	------

Advantage 128k upgradeable to 1.5 Meg (or more with Piggyback Card), with serial, parallel ports, now includes Sidekick version 1.5 non-copy protected (game port and second serial port optional).....	special
---	---------

RAMpage upgradeable to 2MB, fully supports LOTUS/INTEL expanded memory specification (EMS).....	call
---	------

Amdek

Video 300G composite monitor (green).....	129
Video 300A composite monitor (amber).....	139.

Video 310A mono monitor (amber).....	169.
Color 600 - RGB monitor.....	399.
Color 700 - RGB monitor.....	439.

Compucable

Plastic Keyboard & Drive Cover Set.....	17.
IBM Mono Screen Enhancement.....	17.

Cuesta

Uninterruptible power backup units	
Datasaver 240 WATT.....	call
Datasaver 400 WATT.....	call

Curtis

ACCESSORIES	
PC Pedestal (for IBM Mono or Color).....	37.
Portable Pedestal.....	47.
System Stand.....	19.
System Stand for IBM-AT.....	37.
Low Profile Tilt and Swivel Pedestal.....	37.
Crystal 300-watt (line conditioner).....	159.

"Can't anyone help me?"

he cried. Suddenly, the storm increased in fury, shaking the building and knocking a magazine off his desk.

It fell open to a critical page...

CABLES

- AC Plug Adapter (any monitor to your PC) 8
- Smartmodem to IBM Cable \$17
- Keyboard Extension Cable (3 to 9 feet) 27
- Extension Cables for IBM Mono Display 33
- Color and Monochrome Extension Cables 39

SURGE SUPPRESSORS

- All surge suppressors have an on/off switch.
- Safeslip 21
- Diamond (6 outlets) 28
- Emerald (6 outlets; 6 ft cord) 34
- Sapphire (3 outlets; EMI/RFI filtered) 44
- Ruby (6 outlets; EMI/RFI filtered; 6 ft cord) 50
- Command Center (5 outlets; EMI/RFI filtered; digital clock; master key switch; circuit breaker) 123

DataProducts

- 8050 color printer call
- 8070 color printer call

Epson

All Epson dot matrix printers have built in graphics capability. In addition, the LX-80, FX-85, FX-185 and LX-90 can all print in near letter quality (NLQ).

- DX-10 call
- DX-20 call
- FX-85 (replaces FX-80+) call
- FX-185 (replaces FX-100+) call
- LX-80 call
- LX-90 call
- LQ-1500 (letter quality dot matrix) call
- SQ-2000 Ink Jet call
- Epson Books call
- Printer-to-IBM cable 15

We are an authorized Epson service center. Ask about the extended service plan.

FTG

- Light Pen 195
- Demo Disk for Light Pen 39

Hayes

- Smartmodem 300 149
- Smartmodem 1200 389
- Smartmodem 1200B (w/Smartcom II) 349
- Smartmodem 1200B (no software) 289
- Smartmodem 2400 579
- Smartcom II 2.1 (software) 89
- Triset 1000 289
- Accessory Kit for Triset 1000 (cable and software) 29

PC Connection Hardware Special

through December 31, 1985

AST RESEARCH

• Advantage Board

An AT Multifunction Card

Includes:

- Parallel and serial ports (2nd serial and game port optional)
 - uses both 64k and new 256k RAM
 - 1.5 MB parity checked memory on one single card (or up to 3MB with piggyback option)
 - Comes with Sidekick non-copy protected
- For the IBM-AT \$379

Hercules

- Hercules Color Card (parallel port) 169
- Hercules Graphics Card (parallel port) 289
- Hercules Graph-X Software 2.0 42

Innovative Concepts

- Flip n' File 50 12
- Flip n' File 50 w/lock 18
- Library Case (holds 10 disks) 4

Kensington Microwave

- Masterpiece 94
- Masterpiece Plus 129
- Printer/portable computer stand 17

Key Tronic

- 5150 keyboard 139
- 5151 keyboard (deluxe) 169
- 5153 keyboard (with touch pad) 289
- AT Converter (allows Key Tronic 5151 keyboard to work with the AT) 12

Kraft

- Joystick 29
- Executive Cursor Control (w/Joystick) 47
- Executive Cursor Control (software only) 27

1-800/243-8088

PC Connection 180M
6 Mill St., Marlow, NH 03456
603/446-3383

For the IBM-PC Exclusively.

Mouse Systems

- PC Mouse (w/software, pad, & PC Paint) 139

NEC

- Printer P2-3 (IBM, 80 column) \$559
- Printer P3-3 (IBM, 132 column) 758
- Printer P5 (IBM, 132 column) 899
- Sprinter 2050 (letter quality 17 cps) 679
- Sprinter 3550 (letter quality 32 cps) 1099
- Sprinter 8850 (letter quality 50 cps) 1489

Orchid Technologies

- All Orchid Boards come with PCnet Drive (Ram disk), PCnet spool (print spooling), disk caching & partitioning
- Conquest Multifunction Board (2k upgradeable to 2Mb, fully supports LOTUS/INTEL expanded memory specification (EMS), includes clock calendar, serial port, and parallel port. A PCnet Daughter Board can be added 289.

PCnet Daughter Board piggybacks to

Conquest with networking software call

PC Net (stand alone card) call

PC Turbo 166 w/256k and Turbo Daughter

Board expandable to 640k, increase the

speed of your PC call

Eccell Multifunction Card for the AT

2k upgradeable to 1 Meg, fully supports

LOTUS/INTEL expanded memory specification (EMS) and Error Correction Code

(ECC), (serial and parallel ports optional) call

Paradise Systems

- Modular Graphics Card 275
- Backpack for Modular Graphics Card (2k upgradeable to 384k) 225
- Multidisplay Card 195
- Five Pack w/384k 149

PC Designs

- FD 1000 Computer 789
- PC Magazine called it "a top performance bargain" (Oct. 15) PC Week called it "a terrific machine at a terrific price" (May 10)
- Please call for more information about this computer.

Princeton Graphics

- HX-12 RGB monitor (690 x 240) 449
- HX-12E RGB monitor (EGA compatible) 589
- MAX-12E Amber monochrome monitor 179
- SR-12 RGB monitor (690 x 490) 597
- ISM Scan II Board for SR-12 149

PC CONNECTION®

"Call 800/243-8088," said the ad.

"We'll answer your questions, we'll get you what you need. For we are PC Connection, a strong beacon of light and hope in a dark and stormy world." The end.
Happy Holidays!

Quadram

Expanded Quadboard with clock calendar, parallel, serial & game port, I/O bracket, and Quadmaster software.

384k (fully populated) \$219.
2k (upgradable to 384k) 189.

Gold Quadboard 2k upgradable to 640k, includes Quadmaster III software, clock calendar, serial port, parallel port, and IBM compatible color graphics (second serial or parallel port optional) 387.

Silver Quadboard 2k upgradable to 640k, includes Quadmaster III software, clock calendar, two serial ports, and game port 215.

Liberty Board 64k upgradable to 2Mb, fully supports LOTUS/INTEL expanded memory specification (EMS) 287.

Quad Sprint w/8086 processor, increases the speed of your PC 479.

Short Ram Card 64k 169.

MicroLaser Printer Buffer (parallel) w/copy MP 64 (64k) upgradable to 512k 159.

Quadcolor 1 197.

Quadchrome Monitor 469.

SMA

PC-Document Keyboard Templates available for:

DOS/Basic 1.1 Supercalc 3

DOS/Basic 2.0-2.1 Wordstar

DOS/Basic 3.0-3.1 Wordstar 2000

Lotus 1-2-3 Turbo Pascal

Symphony WordPerfect

Multipan (IBM) dBase II

Multipan (Microsoft) dBase III

Framework Multimate each 12.

Toshiba

All Toshiba printers listed are 24 pin dot matrix.

P1340 printer (80 column) 469.

P341 printer (136 column) 899.

P351 printer (136 column) w/serial and parallel interfaces 1129.

WICO

Joystick 35.

DRIVES

All floppy drives are completely pre-tested and are supplied with a printout of the test results. They are shipped with complete step-by-step installation instructions. Drives are 320k/360k.

Control Data (CDC)

(5 1/4") half-height drive (DS,DD) \$75.

OMEGA

Bernoulli Box 20 Meg 2349.

10 Meg cartridge 48.

Head Cleaning Kit 69.

Standard Interface (PC2) Card 129.

We are an authorized OMEGA service center.

OUR POLICY

- We accept VISA and MASTERCARD.
- No surcharge added for charge cards.
- Your card is not charged until we ship.
- If we must ship a partial order, we never charge freight on the shipment(s) that complete the order.

- No sales tax.
- All shipments insured: no additional charge.
- Allow 1 week for personal and company checks to clear.

- UPS Next-Day-Air available.
- COD max. \$1000. Cash or certified check.
- 120 day guarantee on all products.*

To order, call us anytime Monday thru Friday 9:00 to 9:00, or Saturday 9:00 to 5:30.

You can call our business offices at 603/446-3383 Monday thru Friday 9:00 to 5:30.

SHIPPING

Continental US: For monitors, printers, and drives, add 2% for UPS ground shipping. Call for UPS Blue or UPS Next-Day-Air. For all other items, add \$2 per order to cover UPS shipping. We will automatically use UPS 2nd-Day-Air at no extra charge if you are more than 2 days from us by UPS ground.

Hawaii: For monitors, printers, and drives, actual UPS Blue charge will be added. For all other items, add \$2 per order.

Alaska and Outside Continental US: Call 603/446-3383 for information.

1-800/243-8088

PC Connection 180M
6 Mill St., Marlow, NH 03456
603/446-3383

For the IBM-PC Exclusively.

Seagate

20 Meg Internal Hard Drive (w/controller, cables, and manual) \$479.

Shugart

10 Meg Internal Hard Drive (w/controller, cables, and manual) 379.

Tallgrass Technology

TG 5025-25 Meg Hard Drive (w/controller and 60 Meg Backup Unit) call

Tandon

TM 100-2 (5 1/4") full-height drive (DS,DD) 95.

TEAC

FD-55B (5 1/4") half-height drive (DS,DD) 85.

Toshiba

AT 360k Drive (5 1/4") half-height drive ... 99.

MEMORY

64k Memory Upgrade Set for IBM-PC or XT system board or any memory board

150 nanosecond (set of 9) 6.

200 nanosecond (set of 9) 5.

Install memory upgrades & run diagnostics at time of board purchase only 10.

128k Memory Upgrade Set for IBM-AT System Board (9 chips piggybacked) .. 29.

256k Memory Upgrade Set for any IBM-AT memory board (9 chips) 29.

DISKS

DS/DD Disks for the PC & XT (40 TPI) 10 disks per box.

Maxell MD-2 19.

Verbatim DataLife (w/free calculator) 19.

DS/High Density Disks for the AT (96 TPI) 10 disks per box.

Fuji 39.

Maxell 39.

Verbatim 45.

Flip Sort (holds 75 disks) 15.

INFORMATION SERVICES

Compuserve

Compuserve Information Service (includes subscription, manual, 5 hours of connect time, monthly publications) 19.

Dow Jones

Membership Kit 19.

Source Telecomputing

The Source (subscription and manual) .. 39.

* DEFECTIVE SOFTWARE REPLACED IMMEDIATELY. DEFECTIVE HARDWARE REPLACED OR REPAIRED AT OUR DISCRETION. SOME ITEMS HAVE WARRANTIES UP TO FIVE YEARS.
©COPYRIGHT MICRO CONNECTION, INC. 1985. ALL ITEMS SUBJECT TO AVAILABILITY. PRICES SUBJECT TO CHANGE WITHOUT NOTICE.
PC CONNECTION AND PC CONNECTION ARE REGISTERED TRADEMARKS, AND MICRO CONNECTION IS A TRADEMARK, OF MICRO CONNECTION, INC., MARLOW, NH.
THE RACCOON CHARACTER (S) IS A TRADEMARK OF MICRO CONNECTION, INC., MARLOW, NH.

PC CONNECTION®

CIRCLE 339 ON READER SERVICE CARD



PC Pilgrim.

Feast or famine.

Many moons ago, a small band of pioneers fled from the persecution of high prices, and established a foothold in the uncharted waters of IBM-PC add-ons and software. They settled on the banks of the Ashuelot River in the remote outpost of Marlow, NH (present pop. 548).

They faced many hardships, these early mail-order pioneers. Especially during that first winter, when there was little food, less heat, and even fewer orders. But, thanks to their own indomitable spirit and the support of the native intelligent population (pictured above), our heroes survived and thrived.

Kernels of truth. Or, let's talk turnkey.

And so, every year, thousands of PC owners give thanks for our rich harvest of savings, and bumper crop of service and support. Oh, there have been attacks on our humble way of doing business—

from insidious innuendo and bogus braggadocio, to outright offenses against our complex supply lines. But our customers, true believers all, have returned to us again and again as an exemplar of execution in a somewhat slipshod world.

Because if you own an IBM-PC (PCjr, XT, AT) we can help you assemble the entire system you need, from soup to nuts. At what, even we admit, are rather ungodly savings.



The PC Connection cap and scarf, featuring our very own native American mascot. Offer available to customers of every race, color, and/or creed—but not to commercial accounts. Limit one per customer.

The ultimate snow job.

Now when you buy from PC Connection you can really feel warm all over. Because we're giving away a free New England survival cap and scarf to everyone who places a \$500 order between now and December 31.

Just call 1-800/243-8088 or 1-603/446-3383, M-F 9:00 to 9:00; Saturday to 5:30. If you're planning to visit, call ahead to make sure what you want is in stock. The showroom closes at 8:00 M-F and at 5:00 on Saturday.

For the IBM-PC (XT & AT) exclusively.

PC CONNECTION

Some PCs aren't what they appear to be.



These days, there are a lot of people claiming they came up with the component computer idea.

And every one of them is an imposter.

We're PC Designs. We came up with the idea of a kit built from pre-selected, high performance components after we were unable to find an off-the-shelf unit we liked.

Apparently, it was an idea whose time had come. Since its introduction last spring, our FD-1000 kit has received rave reviews and surpassed our wildest sales projections.

And that's the whole problem. Word got out so fast of our success that a lot of mail order houses decided to jump on the bandwagon. Some of them even claim they're selling the same machine. Yet, their kits usually include inferior off-brand components in an effort to drive the price down. Some, despite their second-rate parts, even cost more.

So how can you be sure you're getting the best value in a component computer kit? For starters, pay close attention to product reviews in respected publications.

Who Can You Trust?

How about The New York Times:

"... the programs I ran on the FD-1000 seemed almost to be flying compared to their usual rate on the IBM XT."

How about PC Week:

"In most non-disk tests, (the FD-1000) performed 60-70 percent of the speed of

IBM's top-of-the-line AT—pretty impressive for a machine that costs less than \$2,000!"

How about Paul Bonner:

"Not only is the FD-1000 fully compatible, it has a clear advantage over the IBM PC in terms of expandability... I would still take an FD-1000 over an IBM PC or PC XT any day of the week!"

How about Winn Rosch of PC Magazine:

"Using Peter Norton's Sysinfo speed program, (the FD-1000) achieved a rating of 1.6 times faster than did an ordinary PC. If you're willing—end unafraid—to do a few minutes' worth of assembling, you should find the FD-1000 a top-performance bargain!"

The Real McCoy

The PC Designs FD-1000 is the original item. And its superior performance is no



mistake, because we're doing constant testing to make sure it's built with the highest performance components available. Both the FD-1000 and our hard-disk HD-1000 are based on a top-shelf, highly-integrated motherboard, supplied by ACS International of Dallas, Texas (most of the components we use are made in the USA).

We're proud of the components we've chosen for both the HD-1000 and the FD-1000. And we'd be pleased to tell you exactly what goes into both to make them such exciting machines. Call us at the number below and we'll tell you all about it.

Cheap kits are no bargain

No, the PC Designs units are not "cheap." Yes, they are incredibly low-priced for their performance.

The floppy-based FD-1000 is just \$1,500 complete. Our HD-1000 with a 10MB hard disk is \$1,975 (with 20 megabyte HD it's \$2,100; \$2,600 with 33 megabyte).

You can order risk-free by calling or writing our Tulsa headquarters:

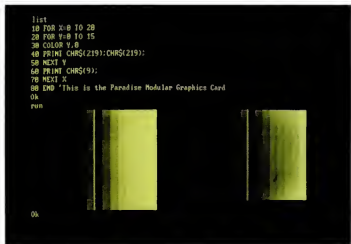
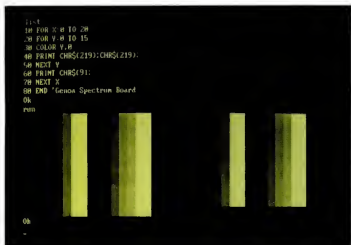
PC Designs

11105-B East 56th St.
Tulsa, Oklahoma 74146
(918) 252-5550

Or through our only authorized mail order outlet:

PG-CONNECTION
6 Mill St. Marlow, N.H. 03456
(800) 243-8088

ALTERNATIVE DISPLAY ADAPTERS



The Paradise Modular Graphics Card rendered colors into a monochrome gray scale more accurately than the Genoa Spectrum, which may give it an edge in critical applications.

When putting IBM color screen displays on a monochrome monitor, the Spectrum translates the color information into shades of gray. Although the documentation claims a total of 16 shades are possible, no matter how I adjusted the brightness and contrast controls on my monitor, the most I could resolve was 14. For practical purposes, that's no great loss.

Hercules emulation put sharp, high-resolution (720- by 348-dot) graphics on my monochrome monitor. Even my official Plantronics software could find no difference between the Spectrum emulation and its favored namesake video adapter.

The Spectrum does not endow all programs with automatic graphics capabilities, however. In particular, most copy-

protected, self-booting game programs won't know how to make the Spectrum shift modes, and their non-DOS designs usually preclude running SM to make the switch for them.

Adventure with Paradise

The Paradise Modular Graphics Card does not claim compatibility with any of the claimed standards of third-party software and video adapter hardware vendors. Instead, it gives you a very special compatibility that will allow you to use virtually any monitor with virtually any software package that will address an IBM Color/Graphics Adapter. Any display that you are likely to want to attach to your PC—IBM-style monochrome, RGB color, or composite monitor or even a television set—can be connected to the MGC with an excellent chance of success.

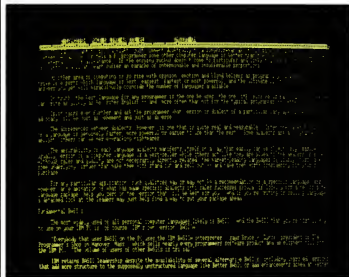
The MGC goes out of its way to be compatible with different monochrome displays. The single bank of DIP switches on the card is dedicated to matching your monitor choice. The MGC manual lists specific settings for seven different models: standard IBM monochrome, Princeton Graphics Systems MAX-12, Roland MB-122 series, Roland MB-142, Leading Edge, Grandwood Monochrome, Amdek 310A, and ITT Monochrome. Paradise also includes a diagnostic program that will help you zero in on the right switch setting for your particular monochrome display.

Before you install the MGC, you must move a jumper to specify what type of monitor you are going to connect to it—either monochrome, RGB, or composite.

No matter what the setting of this jumper, you must configure your PC to use an 80-column by 25-line color display by throwing the appropriate DIP switches on the system board. Consequently, your system will always believe it has a graphics system attached.

Set Up and Forget

For proper operation, the MGC also requires software installation. The software provided by Paradise is unusual because you first boot your system without DOS using only the Paradise-supplied disk and then boot with DOS (or run diagnostics). Once your system is running, you must



Despite their small size, the characters produced by the Genoa Spectrum in its 132-column by 44-row monochrome mode are clear and sharply detailed, as good as those normally shown on the IBM Color Display.

then install a software driver in the CONFIG.SYS file of your boot disk. Paradise supplies an installation program that automatically handles that chore.

At this point, you can probably forget about the MGC. It never requires another thought. If you are processing text or numbers, you get text and numbers on your screen. If you switch to graphics mode, you have graphics—no matter whether your display is color or monochrome.

Don't expect to get a rainbow of colors on your monochrome display. The MGC is versatile but not a miracle worker. However, like the Spectrum, the MGC does a good approximation of color in various shades of gray. The MGC does a slightly better job of translation than the Spectrum. I discovered that by carefully setting both the brightness and contrast controls on my Amdek 310A, I could obtain a full 16-bar gray scale.

The brightness range of the phosphors in my monitor limits the serious application of all those shades, however. When I tweaked in a full black-and-white rainbow, the brightest brights were overdriven and blurred on the screen. Nevertheless,

the colors-to-gray-scale adaptation proved generally pleasing with most programs.

To make ordinary monochrome displays show graphics, the MGC uses a neat trick. It paints 400 lines of 640 dots across the screen and merely duplicates each line that would display on a standard IBM 640-by-200-line RGB color display.

The disadvantage of using this system rather than the Hercules monochrome graphics standard is a loss in resolution. Hercules graphics, including those made by the Spectrum, are almost twice as sharp vertically.

The advantage of the Paradise system and the similar mode of the Spectrum is overwhelming, however. More compatible than any Hercules-style monochrome graphics board, this display mode will work with nearly any software package that will operate an IBM color display.

The MGC goes the Spectrum one better in program compatibility, however. That funny software disk supplied by Paradise lets you set up your system for color graphics on monochrome before you boot up. Thus, you can run non-DOS programs and games in the MGC's color-compatible

monochrome graphics mode.

The color capabilities of the MGC are less spectacular. The board for the most part merely emulates the IBM color display modes. Using a software utility, however, you can switch to a flicker-free color scrolling. Another utility lets you turn off the color on the composite output for clearer images on composite-input monochrome displays. It works like the DOS command MODE BW but is more permanent; most programs will not reset it.

The MGC is called modular because it has a provision for plugging in two daughterboards, a proprietary Paradise A module and B module. You might, for instance, add system RAM and a battery-backed-up clock/calendar.

The MGC also features a header for plugging in a light pen and another for attaching a composite monitor (which requires an adapter not normally supplied with the MGC but available from Paradise at no additional charge) or an RF modulator. The RF modulator is required for connecting a television set to your computer and is not supplied by Paradise.

Tossing It Up

Although similar in their claims to IBM compatibility and monochrome graphics, the Spectrum and MGC are different products. Depending on your needs, you might benefit from either board.

Because the MGC allows virtually any graphics program to display on monochrome monitors, it would be my choice for a single monitor, monochrome-based PC system. What it lacks in versatility, it makes up in its universality. The MGC is genuinely more hardware compatible than the Spectrum. On the other hand, if my goal was to get the utmost in screen sharpness with a few specific programs or to cram as much text as possible onto a single display, I would choose the Spectrum.

For color-based systems, Spectrum is also the card of choice. Although it and the MGC eliminate my biggest complaint about the standard IBM color/graphics adapter—the flickering screen—the Spectrum offers the possibility of more colors and more on-screen text. ■

Winn L. Rosch is a contributing editor of PC Magazine.

Wherever you work, Quadram monitors help you work better.



Quadchrome I



Quadchrome II



Amberchrome



Quadscreen

Work better with the Quadram® family of personal computer monitors. Monitors that perform in any job, from simple word processing to complex graphics analysis.

Quadchrome I makes all your color work bright and clear. For brilliant color displays, look into Quadchrome I. The high resolution, nonglare screen makes Quadchrome I perfect for general PC applications.

Quadchrome II gives you brilliant color and crisp text. For bold, brilliant color and crisp text on a big 14" screen, Quadram gives you Quadchrome II. Quadchrome II displays the 16 IBM® colors and features a true brown.

Amberchrome is perfect for word processing and spreadsheets. When it comes to long word processing or spreadsheet sessions, Quadram's Amberchrome delivers easy-on-the-eyes viewing. Text and graphics appear extra sharp, extra clear.

Quadscreen® and AutoCAD® engineering software make the perfect match. And for engineering applications, there's Quadscreen, the super wide (17"), high resolution monochrome monitor perfect for specialized packages like AutoCAD.

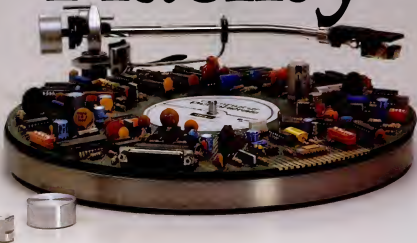
For a closer look, visit your Quadram dealer. Or contact us at One Quad Way, Norcross, Georgia 30093-2919; 404-923-6666.

QUADRAM 
An Intelligent Systems Company

© 1989 Quadram Corporation. All rights reserved. Quadram, Quadchrome, and Quadscreen are registered trademarks of Quadram Corporation. Amberchrome is a trademark of Quadram Corporation. IBM is a registered trademark of International Business Machines Corp. AutoCAD is a trademark of Autodesk, Inc.

CIRCLE 109 ON READER SERVICE CARD

High Fidelity



Why high fidelity boards feed your IBM better data. Longer.

On a turntable, high fidelity means no hiss, no static, no noise.

It means the same in a computer.

No noise is good noise.

Your IBM "reads" data as a series of ones and zeros. But with some expansion boards, you get small amounts of radio frequency interference—noise—that can make a one look like a zero. Or vice versa.

That's called data error.

And if it happens in column 27 of your spreadsheet, the result can be disastrous.

Silent partner.

On a Computer Peripherals High Fidelity Board, we've used wider traces to carry the signal. So there's less noise. And a multi-layer construction makes our boards run cooler and last longer. No noise and no heat mean no data error.

Worth finding.

Computer Peripherals High Fidelity Boards are available as memory expansion up to 512K, multi-function and other configurations for IBM personal computers.

If you value your data, a Computer Peripherals board is worth finding. Call (800) 854-7600 and find out where.

**computer
peripherals**
High Fidelity Computer Components

2635 Lavery Court #5
Newbury Park, California 91320
(800) 854-7600 • In California, (818) 710-1717

CIRCLE 502 ON READER SERVICE CARD

Serious

F O R T R A N

Thirty-years-old, FORTRAN is a survivor. Though it won't win popularity contests with modern languages like C and Pascal, it has made a name for itself as the first high-level language in programming history. Today PC users finally have three high-quality, complete versions of FORTRAN to choose from: among them MS FORTRAN from Microsoft, Professional FORTRAN from IBM, and F77L from Lahey. These compilers, significant improvements over their PC predecessors, are worthy offspring of the venerable mainframe versions.

FORTRAN was developed by IBM and first implemented in 1956, when computers were primarily in the hands of scientists and engineers accustomed to dealing

with algebraic formulas. The name FORTRAN (FORMula TRANslation) and the mathematical appearance of the language clearly reflect the background of its designers. FORTRAN's status as the first high-level computer language almost assured its success, but it was also blessed with a very good design for its time. FORTRAN quickly became a mainstay of mainframe programmers, especially those

You no longer have to be discouraged about using FORTRAN on the PC. The venerable old-timer is well supported by three compilers for PC DOS.

working with mathematical, scientific, statistical, or engineering applications. Until recently FORTRAN was the language used at most universities to introduce students to programming. It's the language of choice on today's supercomputers, equipped with special compilers developed to take advantage of

array-processing technology.

Although various FORTRAN compilers have been available for the IBM PC and other microcomputers, they have never achieved the kind of popularity the language enjoys on mainframes, for several reasons. First, the original design and syntax of FORTRAN didn't lend themselves to structured programming. This situation was partly rectified in 1977, when a committee of the

American National Standards Institute developed a new standard for the language, popularly known as

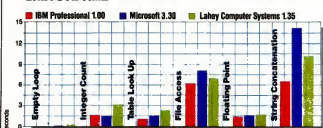
FORTRAN-77. The new standard included IF-THEN-ELSE statements, a wider variety of data types and structures, and other enhancements. Unfortunately, the first microcomputer compilers supported only a subset of this standard.

Another hinderance to FORTRAN's use on microcomputers has been that, typi-

for the PC

FORTRAN

EXECUTE TIME



*Cannot really be measured because elapsed time is less than 1 tick of the PC clock.

FILE SIZE (in bytes)

Empty Loop Test	28,322	29,604	22,556
Integer Count	26,379	29,620	22,076
Table Look Up	28,578	29,656	22,356
File Access	32,306	35,576	28,381
Floating Point	25,416	29,692	22,156
String Concatenation	28,690	30,372	22,556

COMPILE TIME (in seconds)

Empty Loop Test	13	14	14
Integer Count	12	15	14
Table Look Up	17	16	14
File Access	17	16	14
Floating Point	30	21	14
String Concatenation	16	16	14

Benchmark test results for Microsoft's, IBM's, and Lahey's FORTRAN compilers. One peculiarity arose in running the floating-point test. When the test was first run, IBM's FORTRAN completed execution in one-half the time of Lahey's and one-third the time of Microsoft's. These results did not appear to reflect true floating-point differences. Investigation revealed that IBM FORTRAN had recognized what a clever person might: that the two calculations B/C and C/B are the same every time the loop is executed. The compiler therefore performed the calculations 1234.5678.9 and 1234.5678.9 itself, producing a program without a single floating-point calculation! Once the code was revised, the test gave a valid comparison of speeds.

cally, the problems addressed by mainframe FORTRAN programs severely taxed the speed and memory capabilities of microcomputers. FORTRAN users didn't consider switching to PCs because the PC couldn't handle the job.

And if all those reasons weren't enough, FORTRAN made a very inauspicious debut on the PC with the first IBM/Microsoft compiler, released in 1982. Slow, cumbersome, bug-ridden, and limited in capabilities, the compiler dissuaded even the most devoted FORTRAN buffs from using the language on the PC.

The situation has improved dramatically since then, however, and many pro-

grammers who learned FORTRAN in the mainframe environment are now using it on the PC. Current compilers boast support of the full language, access to all available memory, and use of a numeric coprocessor for enhanced speed. Although currently only seven FORTRAN compilers are available for use under PC DOS, most are of quite high quality yet different enough to offer a clear choice to the prospective buyer.

The giant in the field is Microsoft, producer of the oldest and most popular FORTRAN for the PC. Version 3.30 fixes bugs and adds new features, including support for file and record locking.

IBM has a strong contender in Professional FORTRAN, a full implementation of FORTRAN-77 from Ryan-McFarland Corporation, a firm that developed a series of mainframe FORTRAN compilers for IBM in the 1960s. Pro FORTRAN is an optimizing compiler that permits unlimited code and data sizes and also includes an interactive debugger.

The dark horse is F77L from Lahey Computer Systems, a small firm that has specialized in FORTRAN on larger computers for 15 years. The developers cite support of the full language, excellent error diagnostics, and fast compilation as justification for labeling F77L "The Programmer's FORTRAN."

The remaining four FORTRAN compilers for PC DOS now on the market, which *PC Magazine* did not test, are an earlier revision of Microsoft's compiler sold under the IBM label; RM FORTRAN, which is essentially Professional FORTRAN with Ryan-McFarland's name on it; SuperSoft's FORTRAN-66 implementation, which might be useful to those who use programs written exclusively to

PC FACT FILE



IBM Professional FORTRAN, Version 1.0
IBM Corp.
P.O. Box 1328
Boca Raton, FL 33432
(800) 447-4700
List Price: \$595

Requires: 192K RAM, PC DOS 2.1 or later, math coprocessor, two disk drives.

CIRCLE 640 ON READER SERVICE CARD



Microsoft FORTRAN, Version 3.30
Microsoft Corp.
10700 Northup Way
Bellevue, WA 98004
(206) 828-0800
List Price: \$350

Requires: 192K RAM, PC DOS 2.0 or later, two disk drives.

CIRCLE 639 ON READER SERVICE CARD



F77L, Version 1.35
Lahey Computer Systems
31244 Palos Verdes Dr. West,
#243
Rancho Palos Verdes, CA 90274
(213) 541-1200
List Price: \$477

Requires: 256K RAM, PC DOS 1.1 or later.

CIRCLE 638 ON READER SERVICE CARD

NOW
COMES
WITH FREE
PRINTER CABLE!



The world's best selling monochrome graphics card for the IBM PC.

There are more Hercules[™] Graphics Cards in more IBM[®] PCs, XT[®]s and AT[®]s than any other monochrome graphics card in the world.

Over a quarter of a million demanding users around the world use a Hercules Graphics Card to improve the performance of their software.

The Lotus[®] 1-2-3[®] Booster.

Consider Lotus 1-2-3. Hercules gives an off-the-shelf copy of 1-2-3 the highest resolution possible on an IBM PC, XT or AT. More 1-2-3 users choose the Hercules Graphics Card to get crisper text and sharper graphics than any other monochrome graphics card.

And we bring the same performance to other integrated programs like Symphony[®], Framework[®], and SuperCalc[®] 3.

But we don't stop there. The Hercules Graphics Card

improves all kinds of software.

Like Microsoft[®] Word, a word processor that enables you to display text with subscripts, superscripts and italics.

Or pfs:Graph, an easy-to-use business graphics program that converts your data into presentation quality graphs.

Or Microsoft[®] Flight Simulator, the high flying game for the overworked executive.

Or our own Graph X[®], a library of graphics sub-routines that eases graphics programming.

Or AutoCAD[®], a computer aided design program that offers features normally associated with expensive CAD systems.

And we supply free software with each card to do hi-res graphics using the PC's BASIC interpreter. 
State-Of-The-Art Hardware.

The Hercules Graphics Card gives you graphics resolution of 720h x 348v and a

parallel printer port. Our unique static RAM buffer provides sharp 9 x 14 characters and flicker-free scrolling. Our exclusive safety features help



prevent damage to your monitor.

State-of-the-art custom IC technology delivers unsurpassed reliability. Ordinary graphics cards use up to 30 ICs to do what one Hercules IC does. By using fewer parts, we reduce the possibility of component failure.

Which is one reason we warranty the Hercules Graphics Card for two years.

Unbeatable reliability. Advanced technology. Proven by over a quarter of a million users. Why settle for anything less than Hercules?

Call 1-800-532-0600 Ext 400 for the name of a Hercules dealer nearest you and we'll rush you our free info kit.

Hercules.
We're strong on graphics.

FORTRAN FOR THE PC

that earlier standard; and Digital Research's almost-ANSI-77 standard compiler, which reportedly performs well (we received it too late for testing). A FORTRAN interpreter is also available, from Watcom Products.

Standards

ANSI-standard FORTRAN-77 is probably the most portable computer language available, bar none. You can move programs from micro to mini to mainframe changing only the file and device names. Of course, such conversions get a little (or a lot) stickier if a programmer has taken advantage of the extensions to the standard offered by a particular compiler. Unfortunately, most manufacturers make little or no effort to point out which of their features are extensions. Some of them make a

Current FORTRAN compilers boast support of the full language, access to all available memory, and use of a numeric coprocessor.

half-hearted effort by including an appendix enumerating the extensions, but what's needed is a source-listing option that will warn of all non-ANSI usages. Common on mainframe compilers, this option is not found on any evaluated here.

Note: The benchmarks test results indicate that FORTRAN runs more slowly on the PC than other languages because the ANSI standard indirectly specifies a default size of 4 bytes for integers. The PC is much more efficient when processing 2-byte integers; so languages that default to that size will execute much faster, especially for the integer count test. MS FORTRAN and Pro FORTRAN allow you to change the default size to 2 bytes, a change that can cut the execution time for that particular benchmark in half.

Microsoft FORTRAN

MS FORTRAN is the only compiler tested that does not support full ANSI FORTRAN-77—a bit surprising since it is the oldest of the three compilers tested and

The Real Thing

How the compilers perform on a real-life forecasting model adds insight to the benchmark test results. F77L made a surprisingly strong showing.

Benchmark tests, no matter how well chosen, can't guarantee accurate performance predictions for real-life applications. FORTRAN is commonly used to develop forecasting models; so I tested the three FORTRAN compilers using a long-term forecasting model of the U.S. and world agricultural economy, downloaded from a CDC mainframe. Developed by the Department of Agricultural Economics at Michigan State University, the model predicts agricultural prices and production for the next 10 years. These are important to MSU's agribusiness clients, who use the forecasts for strategic planning. The source code consists of five files totaling about 4,000 lines, excluding comments. The model is typical of many FORTRAN programs in that it uses numerous large arrays and performs a lot of floating-point calculations. The program reads two formatted data files totaling about 270K bytes and writes a minimum of 110K bytes of formatted output.

Pro FORTRAN and F77L accepted the mainframe code virtually unchanged, but MS FORTRAN produced many compilation errors. The two biggest changes required were removing comments between continuation lines and editing long variable names that differed only after the sixth character.

F77L compiled the five files in a total of 12 minutes, which was 4 times as fast as MS FORTRAN and an astounding 6 times as fast as Pro FORTRAN.

The executable files varied from 421K for Pro FORTRAN to 444K for

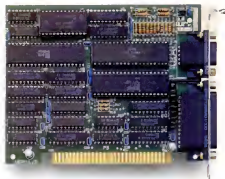
F77L, a spread of only 5 percent. I then tried Microsoft's EXEPACK, which had had only a minimal effect on the benchmark programs. This produced the second big surprise, shrinking the MS FORTRAN executable file by 55 percent, to only 190K. This could be a major space saver for certain kinds of programs, making one wonder why Microsoft doesn't make it standard for its linker.

The simulation model is useful for testing speed because the relative amounts of computation and I/O can be controlled by execution-time commands. I tested it as an I/O-intensive program by limiting it to 200 solution iterations while writing 385K of output; for a compute-intensive test, I set it for 1,000 solution iterations with only 110K of output. I also ran speed tests on a smaller simulation model using double-precision numbers, as well as a linear programming package.

Pro FORTRAN came out first on five of the execution benchmarks, MS FORTRAN garnered the sixth victory as well as three second-place finishes, and F77L brought up the rear with two second places and four third places. For results of the real-world tests, see the accompanying table.

While Pro FORTRAN had a slight overall edge in speed, F77L made a surprising showing that the benchmarks could not have predicted. Of course, these programs are no more the final word in testing than the benchmarks are, but they do add insight into how these compilers perform on real-world programs.—Chris Wolf

Times in minutes	Pro FORTRAN	F77L	MS FORTRAN
I/O-intensive model	10:59	10:16	14:01
Compute-intensive model	19:42	22:28	27:01
Small model, double precision	2:29	2:31	3:35
Linear programming	1:44	1:42	2:16



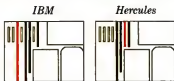
NOW
COMES
WITH FREE
PRINTER CABLE!

Why the Hercules Color Card is better for your XT than IBM's.

Did you know that there's a color graphics card specially designed for the XT? It's called the Hercules® Color Card. We think that it's better for your XT than the IBM® Color Graphics Adapter. Here's why.

The XT comes with an empty short slot. IBM's card is too long to fit in it, so you're forced to sacrifice a valuable long slot, while your XT's short slot goes unused.

The Hercules Color Card is designed to fit in this short slot. It's the smartest way to maximize the usable slots in an XT and provide for your future expansion needs.



Notice how much more efficiently Hercules makes use of the XT's slots.

Our efficient use of an XT's slots is not the only reason to buy a Hercules Color Card instead of IBM's. We give you a parallel printer port at no extra cost. (IBM charges extra and takes up another slot.)

A lot of people wonder how Hercules can do everything that IBM can in a card less than half the size. We do it by designing our own graphics microchips. Just one of our chips packs the punch of dozens of IBM's, reducing by more than 50% the number of components that can fail.

And we'll do just about anything to make our products the most reliable you can buy.



Hercules

IBM

Of course, you *will* have to give up something when you buy a Hercules Color Card. You'll have to give up software incompatibility. With Hercules, there is none. Every program that runs on the IBM color card will run on the Hercules Color Card.

You'll have to give up IBM's ninety day warranty. Ours is two years.

Compare warranties	
IBM	3 months
Hercules	2 years

And you'll have to give up a dollar: The Hercules Color Card is \$245—IBM's is \$244.

Look into the Hercules Color Card for the XT, PC or AT. Find out why the readers of *PC World* voted the Hercules Color Card 1985's best color graphics card—ahead of IBM's. Call 1 800 532-0600 Ext. 420 for the name of the dealer nearest you and we'll rush you our free info kit.

Hercules.

We're strong on graphics.



Lahey's F77L FORTRAN is the compiler of choice. It's definitely a "programmers FORTRAN," with features to aid both the casual and the professional programmer. Although Lahey's compiler is not as mature a product as IBM's or Microsoft's and therefore not as bug free, Lahey responds very quickly to reports of bugs, unlike IBM and Microsoft. What does F77L need? an optional 2-byte integer default, Pro FORTRAN's cross-reference map, and an improved file system.

has been updated several times. Its shortcomings posed some problems in the testing: we had to design two of the benchmark programs around MS FORTRAN's limitations, which included a length limit of 127 for character variables, lack of a character concatenation operator, and no STATUS='UNKNOWN' parameter on the OPEN statement. In testing with several mainframe programs (see the accompanying sidebar, "The Real Thing"), I had more serious problems, some of which surfaced only as run-time errors, which I had to debug—a laborious task.

Language extensions include INTE-

GER*2, LOGICAL*2 and COMPLEX*16 types, hexadecimal constants, an INCLUDE metacommand, assignment of character data to noncharacter variables, and a binary file type, useful for accessing database files. One extension seemed more of a hindrance than a help. MS FORTRAN has no upper limit on the length of variable names, but it uses only the first six characters. It will, for example, treat variables named SYMBOL1 and SYMBOL2 as a single variable named SYMBOL. This quirk affected three of the mainframe test programs. Two of them produced compilation errors because of conflicting declarations, but the third one simply gave erroneous results. To help users find this kind of error, Microsoft should supply an option for flagging long names.

MS FORTRAN does not restrict the size of arrays or common blocks, but it does have a 64K limit for static storage (local variables, arrays, and constants) and limits each compilation to no more than 64K of object code. Within those limits, Version 3.3 will compile longer programs than would previous versions, which often ran out of memory with files over 1,000 lines. Earlier versions also created seemingly endless scratch files during compilation; these files have been reduced in size by almost two-thirds. Using MS FORTRAN on a floppy-based machine is im-

```

PROGRAM COUNT
INTEGER X
CALL GETIN(0,0,0,0)
Z = 0
20 X = X + 1
IF(X .LT. 32767) GO TO 20
CALL GETIN(0,0,0,0)
WRITE(*,*) SEC+RESC*.01
END
    
```

Pro FORTRAN: Integer count test.

```

PROGRAM FLOATP
INTEGER X
INTEGER*2 HR, MIN, SEC, RESEC
CALL GETIN(0,0,0,0)
A = 0.
B = 1234.56
C = 78.9
DO 100 X=1,10000
  A = B*C
  B = A/C
100 CONTINUE
CALL GETIN(HR, MIN, SEC, RESEC)
WRITE(*,*) SEC+RESC*.01
END
    
```

Pro FORTRAN: Floating-point test.

```

PROGRAM LOOP
INTEGER X
INTEGER*2 HR, MIN, SEC, RESEC
CALL GETIN(0,0,0,0)
DO 100 X=1,10000
100 CONTINUE
CALL GETIN(HR, MIN, SEC, RESEC)
WRITE(*,*) SEC+RESC*.01
END
    
```

Pro FORTRAN: Empty loop test.

practical, however, because the necessary files are all so large.

Compilation times are reasonably quick. The compiler's two-pass design is beneficial when checking programs for syntax errors, because the extremely rapid first-pass processor reports such errors. MS FORTRAN was the only compiler to perform cross-checks between subroutines, in one instance reporting a size discrepancy between two declarations of the same common block.

MS FORTRAN produced the largest .EXE files in the benchmark tests. Microsoft's EXEPACK program and a new linker option compress .EXE files. Yet this compression produced improvements of only 10 percent in the benchmark test results.

In accommodating different machine configurations, MS FORTRAN is the most flexible of the three tested compilers. It's the only one that does not require a numeric coprocessor, but it can take advantage of one. (For consistency in results, all speed testing was performed with MS FORTRAN optimized for an 8087.) The

FORTRAN Compiler Characteristics

	IBM Pro FORTRAN	F77L	MS FORTRAN
Memory requirement	192K	256K	192K
DOS requirement	2.1	1.1	2.0
8087 coprocessor	required	required	optional
Disk space	298K (w/o debug lib)	278K	378K (w/o pass 3)
Language	ANSI-77	ANSI-77	Subset ANSI-77 (enhanced)
Interactive debugger	yes	preliminary	no
Overlays	no	chaining	yes
Common block size	no limit	64K	no limit
Array size limit	no limit	64K	no limit
Static data limit	no limit	64K/routine	64K/link
Code size limit	64K/routine	64K/routine	64K/compiler

New!
Look Up!™

For the Right Command

**Software Reference Guides — Right Above your PC:
When You Want to Find Any Command Just LookUp!**

Every LookUp includes all these reference guides:

Ashon Tate dBase II,III Friday Framework Information Unlimited Easywriter II Lifetime Volkswriter	Lotus Development Lotus 1-2-3 Symphony MicroPro WordStar Mailmerge DataStar CalcStar	Microsoft DOS 2.0 BASIC Multiplan Word Microstuff Crontalk XVI	Pentecore Feachtext 5000 Software Publishing pfs:File pfs:Graph pfs:Write pfs:Report pfs:Access	Software Systems Multimate Sorcim SuperCalc SuperWriter Thorn EMI Perfect Writer Perfect Calc	VisiCorp Videcalc Communications CompuServe The Source PC Talk III
--	---	--	--	--	---

Special Introductory Price \$29.90
Buy more than one for \$25.00 each

Check the list. LookUp includes complete command summaries for more than 30 popular programs. You get them all! You can eliminate time wasted searching for commands; slash computer induced frustration; and unlock the full potential of your Personal Computer - with LookUp!

Save Your Valuable Time
You don't have to stop to hunt through those cryptic pages of documentation. You don't have to memorize long lists of precise command formats. No more manual shuffling. All you do is — LookUp! Right atop your monitor (held firmly with velcro pads) is your personal computer "crib sheet." LookUp lets you operate at full speed, all the time.

Eliminate Computer Induced Frustration.
No more infuriating battles with personal memory problems. Put an end to distracting command searches. Keep your desk clear and uncluttered. You'll have a complete library of commands for all your programs - without messing up your desk. Glance up to a complete reference source that gives you the exact format of any command - without ever lifting a finger.

A Glance Convenience
You'll wonder how you ever got along without LookUp. Command summaries are logically categorized so you can locate that missing command instantly. Handy index tabs let you select the appropriate guide quickly. LookUp's sturdy plastic easel supports a rugged three ring binder. Velcro mounting allows you to mount it wherever it's convenient.

Unlock Your System's Hidden Potential

Do you really use all of the commands of your favorite software package? Aren't there a lot of commands that you don't use because you can't quite remember the exact format necessary? Since it's never worth rummaging through those manuals, you just get along without them. But with LookUp above your monitor, all those commands are just a glance away.



Every LookUp includes a rugged plastic display easel and over 30 reference guides.

Introductory Trial Offer

We're so sure that you'll find LookUp invaluable that we're offering it at a special introductory price - and with an unconditional return policy so you can try it without any risk. Read this extraordinary Guarantee:

If at any time over the next year you decide you can get along without LookUp, send it back for a 100% refund... No questions asked.

You've got absolutely nothing to lose. The price is reasonable. There are no hidden costs for shipping or handling. And it's easy to order. Just call our toll-free number anytime (800-772-1234), or return the enclosed coupon.

Look Up!
P.O. Box 34003
Omaha, NE 68134
(702)329-3581

Convenient three-ring format



Organized reference guides

Rugged plastic display easel

Velcro mounting pad

Handy index tabs



Call 800-772-1234 any time

These prices include shipping

☐ Send me one for \$29.90

☐ Send me _____ for only \$25.00 each

Name _____

Shipping address _____

City _____ State _____ Zip _____

Phone (____) _____

Amount _____

Payment: VISA _____ MC _____ Discover _____

Card # _____ Exp. Date _____

Name on Card _____

Send to **Look Up!**
P.O. Box 34003
Omaha, NE 68134

FORTRAN FOR THE PC

compiler has record- and file-locking capabilities, enabling applications to share files smoothly on multiuser or networked systems. Another option is the compiler's use of BCD math, which is useful in financial programs where exact results are important. MS FORTRAN can even interface with routines that are written in Microsoft C and Pascal.

Documentation consists of a user guide, a reference manual, and a READ.ME file. The use of the compiler is explained very thoroughly, with helpful hints on compiling large programs, but the error message descriptions are so terse, they are nearly useless. The reference manual includes adequate detail about the language, but Microsoft takes the wrong approach by describing the features of the full language that it has added to the sub-

MS FORTRAN was the only one of the compilers tested that performed cross-checks between subroutines, in one instance reporting a size discrepancy between two declarations of the same common block.

set. Very few programmers are familiar with the subset; what they really need to know is which full-language features are missing.

IBM Professional FORTRAN

IBM's attempt to link the PC and the mainframe world, Professional FORTRAN, in some ways does have the feel of a mainframe compiler. Pro FORTRAN has some mainframe-compatible extensions, including INTEGER*2 and LOGICAL*1 data, Hollerith and hexadecimal constants, an INCLUDE statement, and the use of dollar signs in symbolic names. The compiler also allows variable names of up to 31 characters and subprogram names up to 8 characters. Pro FORTRAN requires somewhat more rigid adherence to ANSI standards than the other compilers, insisting on all required commas in

```
PROGRAM LOOKUP
INTEGER X
INTEGER*2 HR, MIN, SEC, HSEC
DIMENSION A(25), B(25)
DATA B / 1., 2., 3., 4., 5., 6., 7., 8., 9., 10., 11., 12., 13.,
+ 14., 15., 16., 17., 18., 19., 20., 21., 22., 23., 24., 25./
CALL GETTIM(0, 0, 0)
DO 200 S=1,1000
DO 100 LOOP=1,25
A(LOOP) = B(LOOP)
100 CONTINUE
200 CONTINUE
CALL GETTIM(HR, MIN, SEC, HSEC)
WRITE(*,*) SEC + .01*HSEC
END
```

Pro FORTRAN: Table lookup test.

```
PROGRAM STRING
INTEGER X
INTEGER*2 HR, MIN, SEC, HSEC
CHARACTER*50 A, B
CHARACTER*100 C
CALL GETTIM(0, 0, 0)
DO 100 S=1,10000
A = 'This is a string'
B = 'This is a longer string with lots of words in it.'
C(1:50) = A
C(51:100) = B
100 CONTINUE
CALL GETTIM(HR, MIN, SEC, HSEC)
WRITE(*,*) HSEC*.01*60EC
END
```

Pro FORTRAN: String concatenation test.

FORMAT statements, for example. This requirement can be advantageous for debugging, as when the compiler reported noncommon variables in a BLOCK DATA routine. In contrast, the other two compilers both have "hidden" extensions that can cause trouble if you try to move your code to a more standard compiler. Pro FORTRAN has no limits on the size of programs, common blocks, or arrays; it compiled one 250K source code file to produce an object file of almost 200K. Unfortunately, it was unable to compile some complex programs, especially when the /I option (for 2-byte integers) was used, producing Error 8003, "Internal Compiler Error." In these cases, omitting the /I option or adding the /Z option (to suppress optimization) solved the problem. Error 8002, "Item Overflow," also occurred a couple of times. The manual lists 36 different limits (127 common blocks, 63 arguments per function, and so forth), but the compiler doesn't indicate which one has been exceeded, and so correcting the problem can be difficult.

A cross-reference map of symbols and statement numbers is something that mainframe programmers have come to expect. Pro FORTRAN gives you an excellent one, as well as an allocation map contain-

ing the machine address of every statement. With the addresses given in Pro FORTRAN's run-time error messages, this feature made finding the locations of errors easy, even without use of the debugger.

Pro FORTRAN's output has one very irritating characteristic: unless you ask for a listing by using the /L parameter, you don't get an error report, just a single message telling how many errors were found. Both the other compilers produce an error listing on the screen under all circumstances.

When a program is compiled with the /T option and linked with the DEBUG library, it will run under the control of the interactive debugger, allowing you to set break points and step through the execution of a program in a variety of ways while examining, and possibly changing, the values of variables. One important feature not included is the detection of out-of-bounds array references, one of the most common errors in FORTRAN programs. The debugger slows down execution tremendously, to the point where you'll feel as if you're working in interpreted BASIC. A test program took more than 40 times as long to run with DEBUG as without.

The debugger also doesn't work well

We Think Our SmartWriter™ Is A Good Idea. So Does Our Competition.



You've got to hand it to those other guys. They know a great laser printer when they see it. That's probably why they're making theirs look so much like ours—the remarkable QMS® SmartWriter™.

In fact, the SmartWriter imitations may fool you if you aren't careful. Here's a few questions you can ask, just in case you do get confused. Start with:

"How many standard fonts does your machine have?" If they don't say, "Seven," get suspicious. (SmartWriter even has font cartridges with nine to sixteen fonts on each.)

Then spring the big one on them. Ask, "Will this printer support QUME®, Diablo®, Epson®, and ANSI X3.64 escape sequences?" If instead of answering an emphatic, "Of course!" they say, "Let us take you to lunch," you'll know you're not looking at a QMS SmartWriter.

Now if you want to be cruel, ask, "Will your machine intermix 64 fonts on a line or a page and reverse image or bold face? Will it draw lines and boxes, print subscript and superscript. Will it create and recall MACRO overlays? And, does it support an

RS232 and parallel interface?"

But you don't have to play twenty questions with a sales rep. To be sure you're getting the one-and-only QMS SmartWriter, give us a call. Right now. Just dial 205 633-4300. Or write us at P.O. Box 81250, Mobile, Alabama 36689. We'll give you all the information you want faster than you can say, "monkey see, monkey do."

The remarkable QMS SmartWriter—often imitated, never emulated.

QMS
WHERE IMAGINATION LEADS™

FORTRAN FOR THE PC

```

PROGRAM DIRACC
INTEGER N
INTEGER*2 NR, MIN, SEC, HSEC
CHARACTER*66 RECORD(2)
CALL GETIN(1, 8, 9, 8)
OPEN(1, FILE='TEST.DAT', ACCESS='DIRECT', FORM='UNFORMATTED'
+ RECL=132, STATUS='NEW')
C C C
WRITE 100 RECORDS
DO 100 N=1,100
WRITE(1, REC=N) RECORD
100 CONTINUE
C C C
READ RECORDS BACK
DO 200 N=1,100
READ(1, REC=N) RECORD
200 CONTINUE
C C C
READ, MODIFY, AND REWRITE RECORDS
DO 300 N=1,100
CALL GET(RECORD, X)
RECORD(1) = 'Modified'
CALL PUT(RECORD, X)
300 CONTINUE
CALL GETIN(NR, MIN, SEC, HSEC)
WRITE(*,*) SEC*.51/HSEC
END

SUBROUTINE GET(RECORD, X)
INTEGER N
CHARACTER*66 RECORD(2)
READ(1, REC=N) RECORD
RETURN
END

SUBROUTINE PUT(RECORD, X)
INTEGER N
CHARACTER*66 RECORD(2)
WRITE(1, REC=N) RECORD
RETURN
END

```

Pro FORTRAN: Disk access test.

with large programs, because it adds as much as 160K to the size of an .EXE file. One medium-sized program failed to run with the debugger, which told me there were "too many program units compiled for DEBUG." I'm afraid most users will find the debugger of limited value.

Pro FORTRAN's worst characteristic is its slow compilation speed, which is snail-like at best. The compiler does use this time well, however, producing the efficient code you would expect from an optimizing compiler (see the caption of the benchmark results). As a result, Pro FORTRAN easily won most of the execution speed races.

As with MS FORTRAN, the documentation for Pro FORTRAN is in two volumes, *Installation and Use* and *Reference*. The reference manual is adequate, with particularly good explanations of error messages. It's fairly consistent at flagging nonstandard features wherever they are described, and it also collects them in an appendix. The user's manual is less success-

ful, particularly when describing how best to use the compiler.

(The tested Pro FORTRAN version is designated Version 1.0, but it's newer than the Version 1.0 you'll get if you buy the compiler now. The update is available, though, through IBM dealers, who can supply it to customers experiencing problems with the original release. It includes some bug fixes and performs somewhat better. The newer files are indicated by the 6/20/85 date and a 1985 copyright in the on-screen header.)

F77L

This compiler is sure to gladden the heart of anyone who likes to root for the little guy. I've rarely seen a company that seems to know its market and the particular strengths of its own product as well as Lahey Computer Systems. Its advertising emphasizes exactly the characteristics that are most meaningful to programmers, and the compiler delivers them as promised. Lahey F77L is definitely for the program-

mer's market, with features for the casual and professional user.

F77L is full ANSI-standard FORTRAN with most of the same extensions as Pro FORTRAN plus many of its own. It allows free-format source files and has a CHAIN statement to transfer control to another program. F77L programs can call and be called by Lattice C functions.

Each array and common block is limited in size to 64K, as is the code for each subroutine. Within these restrictions, F77L would compile the largest, most complex programs I threw at it. It was better in this respect than both MS FORTRAN and Pro FORTRAN. Lahey expects Version 2.0, with support of large arrays and common blocks, to be available by the time you read this review. It will supply it free of charge to owners of earlier versions. The other major feature promised in that release is Lahey's complete on-line debugger, a rudimentary version of which has been available since Version 1.2.

F77L is the smallest compiler tested, small enough to be used comfortably on a floppy disk system. It includes an assortment of support files required in different parts of the compile-link-run cycle, including two error message files, a configuration file, and a patch file. The F77L is the first compiler I have seen (outside of beta test) that patches itself every time it runs. Lahey contends that this feature allows the company to fix bugs for customers easily, sometimes within hours. Another curious feature is what seems to be an "executive" object module that must always be linked along with our own object files.

The error messages, both from the compiler and at run time, are truly helpful. Two of the best aspects of the error system are the comprehensive compiler warning errors and the optional run-time array-bounds checking.

F77L's other great strength is its speed of compilation; it easily outruns its competitors. It gives up a little in execution speed to achieve the compilation speed, but not as much as its third-place finish in the execution benchmarks would indicate. I hope that the move to a large memory model in Version 2.0 doesn't have a negative effect on either compilation or execution speed. It would also be nice if Lahey added an option for a 2-byte integer de-

fault, to speed up programs that have no need for large integers.

This compiler departs from the intent of the ANSI standard for FORTRAN, if not the letter, in a couple of small ways. If a real number is written out with a FORMAT specifying more digits than the internal accuracy of the machine, all the "unknown" digits are represented as asterisks, making the field unreadable by another program. A PRECFILL routine overrides this behavior, but it is of course nonstandard as well. I was nevertheless fascinated with this feature, since it forcefully drives home the point that the numbers we see on computer printouts are often much less precise than they seem.

Strange Behavior

The most annoying problems I found are in the file-handling system. First, the only preconnected file is unit 0; every oth-

tures that are extensions are not mentioned, and the strange behavior of the CON device is not described.

These problems don't outweigh F77L's fine overall design. The aids to debug-

ging, the fast compilation speed, and full range of features add up to a package that comes closest to being the FORTRAN compiler for the PC that programmers want. ■

One of F77L's great strengths is its speed of compilation; it easily outruns its competitors.

er unit must be explicitly opened. In addition, both MS FORTRAN and Pro FORTRAN supply a means of doing file substitutions at execution time, but F77L does not. Finally, F77L has a very peculiar way of handling standard input and output, which in PC DOS both correspond to the CON device. It's normal practice to open both unit 5 and unit 6 as CON and then use redirection to specify the actual input and output files. With F77L this operation results in every line of input being echoed to the output file. Lahey's suggestion is to write code to prompt for the filename at execution time, but this procedure shouldn't be necessary.

F77L is documented in one manual; it's fairly complete as a language description but short on helpful information. The fea-

Chris Wolf is manager of computer services for the agricultural economics department at Michigan State University in East Lansing. He has been programming in FORTRAN for 20 years. This is his first article for PC Magazine.

**Most experts will tell
you that easy to use,
extremely powerful yet
flexible software like
ours doesn't exist.**

**Call us for a second
opinion.**

Learn About

ENRICH™
THE METHODS EXPERT

800-633-3444

**Migent Software, Inc.
8300 N. Hayden Rd., Suite 203
Scottsdale, Arizona 85258
(602) 483-1515**

ENRICH® and The Methods Expert® are
registered trademarks of Migent Software, Inc.

CIRCLE 496 ON READER SERVICE CARD

Why our competitors hate our guts.



The "guts" of every Goldstar monitor are built to the same high standards as monitors built by PC makers for their PCs.

But there's one great difference.

The prices of our monitors are substantially less—even though our monitors are designed for IBM PCs and compatibles.

We offer a complete line of color and monochrome monitors with specs that are equal to or better than the leading competition.

For example, our MCH-4015 13" RGB color monitor has a chemically-etched non-glare screen, .31mm dot pitch, 790 maximum lines and 25 MHz bandwidth for superb resolution and performance.

Every Goldstar monitor is backed by 250 service centers all over the U.S., and by a company with sales of \$8.7 billion worldwide that is internationally known for

its excellent engineering.

So now you can choose the greatest PC your money can buy. And then pick a monitor from Goldstar and get the best of both worlds—instead of taking the high-priced monitor the PC maker supplies.

The more our competitors dislike us, the more you'll love us.



MHM-2045 12" Monochrome Monitor and MCH-4015 13" Color Monitor



GoldStar®

Expensive electronics. Without the expense.

©1985 Goldstar Electronics, Inc. Ltd. Lyndhurst, N.J. 07037

CIRCLE 373 ON READER SERVICE CARD

TallScreen: More DOS Power to You

Utilities can be handy adjuncts to DOS, and occasionally a particular one can be a godsend (if it reclaims files that have been accidentally erased, for example), but only a few become indispensable tools. *TallScreen*, a new utility from Qualitas Inc., is so useful that I mistakenly hit the program's keystrokes even when I'm using other PCs. I feel handicapped and ineffectual without its powerful presence.

TallScreen boasts two main functions that quickly become second nature. First, it stores DOS output in a memory buffer and allows you to scroll up the screen to

TallScreen's powerful DOS enhancements let you work around the operating system's limitations. And, at \$49.95, it's one of the real bargains available for the PC.



TallScreen's help screens detail DOS 2.x and 3.x commands. You use the PC's function keys to invoke these screens from DOS and to move from one to another.

see text that has already scrolled off the top of the display—a feature we can all appreciate. You can review files typed to the screen, edit files with *TallScreen's* built-in editing functions (which often eliminate the need for using an editor for small files like CONFIG.SYS or AUTOEXEC.BAT), avoid reissuing directory and other commands that may have scrolled off the

display before being read completely, and so on.

An equally useful function is *TallScreen's* ability to store multiple DOS commands in a circular queue so they can be reissued or edited. DOS itself normally stores only the single DOS command last executed. Similarly, *TallScreen* also stores change-directory path commands for im-



TallScreen
Qualitas Inc.
8314 Thoreau Dr.
Bethesda, MD 20817
(301) 469-8848
List Price: \$49.95
Requires: 64K RAM, one disk drive, DOS 2.0 or later.

CIRCLE 626 ON READER SERVICE CARD



Leaders have always recognized good advice...

Bring your company's presentation graphics into the computer age with the best recommendation you can make: Hewlett-Packard.



Hewlett-Packard's Graphics Plotters introduce *professional-quality* graphs and charts to the office... quality that, quite frankly, makes the competition look stone-age by comparison.

Combine our brilliant color capability, precise line quality, and proven reliability—and HP becomes the obvious choice for your presentation graphics needs. When it comes to plotters, it's easy to see why HP has become the world's Number One recommendation.

Compare the quality of an HP Plotter...

Before making your graphics plotter recommendation, find out how HP stacks up against the competition. Here's a quick checklist:

Are the lines sharp and bold? Do they meet precisely? Are the diagonal lines smooth? Is the text easy to read?

In a chart, is the area fill uniform? With HP, the answer is always yes, yes, and...yes.

Runs with leading PCs and software packages.

HP Graphics Plotters are compatible with most of the personal computers in your office, including IBM, Compaq, and AT&T—as well as a host of HP computers. You even have a choice of many off-the-shelf software packages, such as Lotus 1-2-3™ and Symphony™,* that give you "first-day" productivity.

Send today for your FREE sample plots—and see exactly what we mean.

Return the coupon—or call us toll-free at (800) FOR-HP-PC. We'll send you a detailed brochure, a list of available software, plus sample plots from both an HP Graphics Plotter and a leading printer. Don't resort to stone-age methods before seeing the difference an HP Graphics Plotter can make. Call Hewlett-Packard today.

*1-2-3 and Symphony are trademarks of Lotus Development Corporation.

**Leadership in Business Graphics.
For Leaders in Business.**



**HEWLETT
PACKARD**

CIRCLE 153 ON READER SERVICE CARD



YES, I'd like to make the most informed business graphics recommendation I can. Please send me your detailed brochure, plus sample plots so I can see exactly what my company's presentations have been missing. I understand I will receive this information without cost or obligation.

Name

Title

Company

Address

City State Zip

Mail to: Hewlett-Packard, 16399 W. Bernardo Dr.
San Diego, CA 92127-3899
Attn: Marketing Communications. 11502 PMY

mediate recall, which greatly facilitates moving around on a hard disk with a complex subdirectory structure.

These functions make a DOS session much faster and more convenient. No more stabbing futilely at the Ctr and Num-Lock keys to stop a rapidly scrolling file from zipping off the screen, no more reentering long pathnames because of a one-character typing error, no more rekeying long commands just to change a drive designation.

But this is far from all *TallScreen* does. It accepts multiple DOS commands on a single line so you can execute a series of commands without creating a batch file. It can mark a block of text on-screen and print it, save it to a disk file, and perform other manipulations. It assigns user-defined sequences to keys, much like a keyboard utility. It provides all the functions normally performed by the ANSI.SYS screen driver but allows ANSI key redefinitions in a much more natural and readable manner.

I had no trouble at all installing *TallScreen* on my AT and PC. The program installs as a console device driver under DOS 2.x or 3.x through the CONFIG.SYS file that DOS reads when it starts. Batch files are supplied with the program that automate the installation process so that it is a painless and straightforward endeavor. Incidentally, the distribution disk is not copy protected.

You can modify several different aspects of *TallScreen's* operation to accommodate your personal preferences or particular machine limitations. The amount of memory allocated to storing previous directories, key definitions, and screen displays, how the program writes to graphics screens, the video attributes used to display marked blocks and other screen areas, and more can be adjusted and stored in files that the manufacturer calls profiles for repeated use. The very attractive program provided to change screen attributes should be used as a model for such useful utilities.

Several sample profiles are included that emulate some of the functions of popular word processing programs. The standard default profile defines many useful functions (combinations of the primitive commands provided by *TallScreen*) as-

signed to function keys, including moving the cursor from screen memory to the DOS command line to execute a command, sending blocks to disk files, completely erasing the DOS command line, erasing from the cursor position to the end of a line, inserting, splitting and joining lines, capturing text from the screen buffer and executing it directly, and moving through the queue of stored directories or commands.

You can "freeze" blocks so that they don't scroll off the screen, which is useful for keeping a group of filenames accessible for editing or other manipulations (a corresponding Thaw command releases the block). Frequently used paths can be

TallScreen accepts
multiple DOS commands on
a single line so you
can execute a series of
commands without
creating a batch
file. It can mark a
block of text on-screen
and print it, save it to
a disk file, and perform
other manipulations.

"preentered" into the path queue by including them in the Profile command, and key definitions can be entered or modified in a number of ways.

In spite of its many sophisticated functions, *TallScreen* is actually quite easy to use. It becomes totally intertwined with DOS. In fact, the program works so closely with DOS that it becomes an almost automatic extension of your thought process.

The *TallScreen* package remains resident in memory once invoked. The program and its associated buffers consume about 64K bytes of memory, although this memory requirement can vary depending on the space allocated to storage of the various elements *TallScreen* can track. Some memory-resident programs cause conflicts with other such programs, or even worse, with some normal DOS programs. Fortu-

nately, *TallScreen* seems far more compatible than most DOS enhancement programs. It worked correctly with *SideKick* and *ProKey*, and applications like *WordStar*, *1-2-3*, *dBASE*, and *AutoCAD* presented no problem. The output of most applications programs is not stored in the *TallScreen* display buffer, although *TallScreen* does have commands that attempt to intertwine the utility with applications that use certain DOS I/O calls. The only foolproof way to determine if this works is to try it; the only one of several programs I tried that worked was *DEBUG*, which was enhanced tremendously by the added *TallScreen* commands.

TallScreen worked beautifully on my IBM AT hard disk system. System response is slowed slightly on my floppy-based PC. Because of the path-queue system, the program must access the current default disk every time a command is input, a procedure that slows things down a little on floppy systems. You can disable the path-queue mechanism if you're not using paths (as you generally wouldn't on floppy-only computers), so you can avoid even this minor speed penalty.

Introductory and advanced tutorials on the distribution disk demonstrate the program's capabilities. The printed documentation is a 40-plus page typeset and ring-bound book. While the manual is detailed and complete, the writing style is a bit confusing and could use a simpler and clearer revision.

TallScreen displays a large help window on demand. It has similar help screens for DOS 2.x and 3.x commands and another for the numeric values of the IBM line-drawing character set. Function keys can let you automatically switch between the various help screens. The screens are normal ASCII text files, so it is easy for you to create equally accessible personalized help screens.

Overall, *TallScreen* is simply a superb package at a superb price. Other programs offer subsets of its features (*Opt-Tech's Scroll & Recall*, for example), but nothing else as powerful yet simple as *TallScreen* exists on the market, to my knowledge. I very rarely get tremendously excited about utility programs, but *Qualitas's TallScreen* is now a permanent part of my toolbox. The storage of screen output, commands,

Business as Usual?

Business as usual these days means a computer that's up and "humming" but if your computer were stolen or damaged, you wouldn't have business as usual.

YOU'D HAVE TROUBLE!

You can get fast replacement for your entire system and be back in business in a hurry by protecting your computer with **SAFWARE** Personal Computer Insurance. It's the only coverage designed specifically for personal computers used for business — in your office, shop or home. **SAFWARE** protects ALL hardware. ALL purchased software and ALL media against theft, accidental damage, natural disaster, power surge, etc., regardless of use, after a low \$50 deductible.

(Not without your computer it wouldn't be.)

Fast, courteous claims handling prevents your losing valuable business computing time.

Find the premium price for the coverage you need listed in the table below, available for as low as \$39 per year. Fill in the coupon today. Your coverage will begin as soon as your payment is accepted. Or, for even faster coverage, call our toll-free number.

1-800-848-3469

(In Ohio call 1-614/262-0559)

Phones open 8 a.m. to 8 p.m.

Monday through Friday

Saturday 9 a.m. to 5 p.m.



Total Hardware, Media & Software System Value	Annual Premium
Up to \$ 2,000	\$ 39
\$ 2,001-\$ 5,000	\$ 69
\$ 5,001-\$ 8,000	\$ 89
\$ 8,001-\$11,000	\$109
\$11,001-\$14,000	\$129

Call toll-free for rates on higher coverage. It is an underwriting requirement that you insure your system for its full value. Not available in CA, KY, MT, NY, TX, WA, WI, CANADA, or overseas; call for other coverages.

PC

Mail to: **SAFWARE**, P.O. Box 0221, Columbus, OH 43202

Before I'm out of business,
please issue my **SAFWARE** Insurance Coverage

Name _____

City _____ State _____ Zip _____

System value \$ _____ ☐ Check Enclosed ☐ VISA ☐ MasterCard

Card # _____ Exp. Date _____

Signature _____

No risk. You may return contract for full refund within 30 days. Coverages and limits are subject to the terms, conditions and exclusions in the contract.

STATEMENT OF OWNERSHIP, MANAGEMENT AND CIRCULATION (Required by 39 U.S.C. 3685)

1. a. Title of Publication: **PC** (The Independent Guide to IBM Personal Computers). b. Publication No. 07452500. 2. Date of filing: October 1, 1985.

3. Frequency of Issue: Bi-Weekly. a. No. of issues published annually: 26. b. Annual Subscription Price: \$34.97.

4. Complete mailing address of known office of publication: One Park Avenue, New York, New York 10016.

5. Complete mailing address of the headquarters or general business offices of the publishers: One Park Avenue, New York, New York 10016.

6. Full names and complete addresses of publisher, editor, and managing editor: Publisher: Jeff Weiner. One Park Avenue, New York, New York 10016; Editor: Bill Machine. One Park Avenue, New York, New York 10016; Managing Editor: None.

7. Owner: Ziff-Davis Publishing Company, One Park Avenue, New York, N.Y. 10016; Ziff Corporation, One Park Avenue, New York, N.Y. 10016.

8. Known bondholders, mortgagees, and other security holders owning or holding 1 percent or more of total amount of bonds, mortgages or other securities: None.

10. Extent and nature of circulation:

	Average No. Copies Each Issue During Preceding 12 Months	Actual No. Copies of Single Issue Published Nearest to Filing Date
A. Total no. copies printed (Net Press Run)	324,027	370,981
B. Paid and/or requested circulation		
1. Sales through dealers and carriers, street vendors and counter sales	37,700	35,200
2. Mail subscriptions	220,700	259,600
C. Total paid and/or requested circulation (Sum of 10B1 and 10B2)	258,400	294,800
D. Free distribution by mail, carrier or other means		
1. Samples, complimentary, and other free copies	2,250	2,518
E. Total Distribution (Sum of C and D)	260,650	297,318
F. Copies not distributed		
1. Office use, left over, unaccounted, spoiled after printing	3,077	1,773
2. Returns from news agents	60,300	71,890
G. Total (Sum of E, F1, and F2—should equal net press run shown in A)	324,027	370,981

11. I certify that the statements made by me above are correct and complete.

William L. Phillips, Vice President

TALLSCREEN

and paths is the program's most accessible and obviously useful feature, but after a while, the ability to edit displayed files, write screen areas out to disk, issue multiple commands from the keyboard, and the other more sophisticated capabilities become equally important. **TallScreen**'s almost total flexibility of design and function allows you to tailor it to even your most idiosyncratic preference. The program's supplier, Qualitas, also offers **PrintMan**, a good printer manager (see "Printer Utilities Make the Difference," Volume 4 Number 25), and the company is solid and offers good product support.

The IBM 640K restriction is becoming increasingly oppressive as memory prices

The storage of screen output, commands, and paths is the program's most useful feature, but the ability to edit displayed files, issue multiple commands from the keyboard, and other sophisticated capabilities soon become equally important.

fall through the basement and more-desirable memory-resident programs appear. **TallScreen**'s memory usage is not excessive, and neither is that of **SideKick/Spotlight** or **ProKey/SmartKey**. All together, though, a lot of memory can be used. **TallScreen** is so good that its cost both in money and memory is amply (and quickly) paid back.

Qualitas's **TallScreen** is probably best for the advanced PC user who can appreciate the power built into the many useful functions provided. Even beginners, however, will benefit by using some of the program's best features. The fact that **TallScreen** costs only \$49.95 makes it one of the real bargains available in the PC marketplace. ■

Glenn Hart is a contributing editor of PC Magazine.

**"Out of boredom, I picked
up a computer magazine.
I started reading it
and I thought, 'Jeez!
I don't understand
a word of this.'"**



LES IS MORE.

Les Freed learns quickly.

Within a week of his first uncomprehending encounter with a computer magazine, he bought his first personal computer.

*Les Freed
President, CEO
Microstuf*

Within a year, he and partner Bob Strong had invented Crosstalk™ communications software, to help them share data without driving back and forth across Atlanta.



Not long after, Freed left behind a stellar career—chasing popes and presidents for CBS News—to form Microstuf, to market his product. Maybe, he thought, we can sell 500 copies.

Over 400,000 units later, sales and royalties from the Crosstalk family of products continue to rise, placing them high up on the Softsel Hot 100 week after week. In the process, Microstuf has grown into a major player in the IBM PC industry.

The Right Stuf

When Les Freed embarked on his venture, few others believed that business users of PCs needed anything other than a word processor and spreadsheet.

He's been spectacularly successful at demonstrating otherwise.

There's a good reason for Freed's success: Microstuf offers business users a



superior solution to the widespread problem of data sharing. It provides customers a product with all the capabilities they're likely to need, without

shortchanging Crosstalk in order to make it too easy to use.

Moreover, Les Freed has maintained an active dialog with his customers from the start, and a constant dedication to offering them high quality communications products. As a result, he makes software that real people can use to solve real business problems.

And in so doing, he and his colleagues at Microstuf have been instrumental in helping business realize the awesome potential of the personal computer.

All Work and All Play

But that wasn't precisely Les Freed's intention when he took his first steps into unknown territory. Back then, he was fueled more by the excitement of discovery and the challenge of hard work.

And the fun of creating something new.

Fun like 2:00 AM breaks from brainstorming to race radio-controlled Porsches around the parking lot. Fun like being named to the governor's Fast Tech 50 for two years running.

Fun like starting with nothing more than an idea, and from it building a thriving company that gives American business

a new and better way to communicate.



Exploring the power of the PC, people of vision are transforming the very nature of how we conduct business.

Some — The Trailblazers — lead the way by bringing to market new tools and new ways of using computers to unleash productivity and creativity.

Others are bringing this revolution into every company in the land, by applying these tools to business every day.

These are the readers of *PC*. The people whose decisions drive your market.

"The people who dug into their own pockets and bought our products in the early days are now in charge of evaluating and buying PC equipment for their companies. Those are the people who read *PC*."

Les Freed



PC
MAGAZINE

Your business depends on it.

ZIFF-DAVIS PUBLISHING CO., ONE PARK AVE. • NEW YORK, NY 10016 • (212) 503-5100



SHOP AROUND... THEN CALL PC AMERICAN AND SAVE!



PC AMERICAN — offering quality product, prompt expert service and full manufacturer's warranties at money saving prices.

PC SYSTEMS

IBM PC

- 1. 256K, no drives, KBD & FDC \$1450
- 2. 256K, 2 drive system \$1645
- 3. 256K, 2 drive monochrome system \$1940
- 4. 256K, 2 drive color system \$2160
- 5. 256K, 2 drives & 10MB system \$2183

IBM PC XT

- 6. 256K, 1 drive 10MB system \$2352
- 7. 256K, 2 drive monochrome system \$2322
- 8. 256K, 2 drive color system \$2409

IBM PC AT

- 9. 256K, 1 2MB floppy \$3164
- 10. 512K, 1 2MB floppy, floppy 360K drive, 20MB \$3600

COMPAG

- 11. PORTABLE 2 drive system \$2905
- 12. DESKPRO I, no drives \$1751
- 13. DESKPRO II, 2 drives \$1921
- 14. 286-1 PORTABLE, 1 2MB floppy \$2377
- 15. 286-1 DESKPRO, 1 2MB floppy \$3164
- 16. 286-2 DESKPRO, 1 2MB 20MB \$4473
- 17. 286-3 DESKPRO, 1 2MB 30MB, 10 Tape \$4972

SUPER COMPUTER (IBM PC/XT compatible computers)

- 18. 256K, 1 drive, KBD, 135W power, 8 slots \$734
- 19. 256K, 2 drives, monochrome system \$1255
- 20. 256K, 2 drives, color system \$1395

SANTO COMPUTER call

STANDARD FEATURES

- 256K, 135W PS, 8 slot, IBM PC/XT compatible, one year warranty on parts and labor

All systems are brand new, with 90 warranty, tested with advanced diagnostics, and ARE ALWAYS IN STOCK

FLOPPY DISK DRIVES

- 1. TEAC 350 360K \$65
- 2. PANASONIC 550 360K \$65
- 3. TOSHIBA 550 360K \$65
- 4. MITSUBISHI 360 4851 \$65
- 5. TOSHIBA 1 2MB AT (DRIVE) \$170
- 6. TOSHIBA White Face Drive 360K for AT \$170
- 7. TANDON TM-100 1 360K Full Height \$170
- 8. TEAC 502L, 1 2MB (AT) high density floppy \$175

HARD DISK DRIVES

- | | Average | PC XT | PC |
|----------------------------|---------|--------|--------|
| | | COMPAG | AT |
| 10MB half height | | | |
| 1. SHUGART 712 | 90ms | \$395 | \$390 |
| 2. SEAGATE ST-212 | 80ms | \$490 | \$472 |
| 3. TANDON TM-252 | 85ms | \$570 | \$570 |
| 4. RODIME RD-352 | 85ms | \$585 | \$535 |
| 20MB half height | | | |
| 5. SHUGART | 90ms | \$495 | \$480 |
| 6. SEAGATE ST-225 | 85ms | \$590 | \$448 |
| 7. TANDON TM-503 | 85ms | \$590 | \$495 |
| 8. RODIME RD-202L | 85ms | \$585 | \$525 |
| 9. MITSUBISHI rack mounted | 68ms | \$770 | \$550 |
| 20MB full height | | | |
| 10. RODIME RD-202E | 85ms | \$535 | \$563 |
| 11. SEAGATE ST-402S | 76ms | \$585 | \$484 |
| 12. COME 204B | 39ms | \$1470 | \$1320 |
| 30MB half height | | | |
| 13. TULUM | 80ms | \$990 | \$900 |
| 30MB full height | | | |
| 14. SEAGATE ST-403B | 36ms | \$961 | \$822 |
| 15. COME 104B | 39ms | \$2220 | \$2065 |
| 40MB full height | | | |
| 16. RODIME 204L | 55ms | \$1650 | \$990 |
| 17. SEAGATE ST-4051 | 36ms | \$1106 | \$831 |

All drives include mounting hardware, cables, and instructions. PC XT, COMPAG kits include central card. AT kits include mounting hardware and cable. Choose from controllers, REEC, WESTERN DIGITAL, OMM, DTC, ADAPTEC and FALCON

MODEMS

- 1. HAYES Smartmodem 1200B (internal 300-1200) \$379
- 2. EVEREX Modem 1200 300 internal w/ software \$229

EXPANSION CHASSIS

- 1. Single drive chassis with 30 W power supply for floppy \$86
- 2. Double drive chassis with 70 W power supply for hard disk \$129
- 3. Four drive chassis EVEREX SLIM, 150 W PS, 3 slots for cards \$710
- 4. Four drive chassis EVEREX SLIM, 70 W PS, 3 slots \$770

MULTIFUNCTION BOARDS

AST RESEARCH

- 1. S/Pk W-54K (ISA-256K, S/P, SHV C/D opt) \$279
- 2. S/Pk W-384K, S/P, C/C opt. \$258
- 3. I/O Plus II (S/C, C/C opt) \$139
- 4. Advantage (AT compatible memory w/ slots up to 2MB) \$282

INTEL

- 6. Above Board PC with 64K up to 512K \$295
- 7. Above Board PC with 256K up to 2MB \$395
- 8. Above Board Kit with 128K up to 1 1/2 MB \$595
- 9. Above Board Kit with 512K up to 2MB \$795

QUADRAM

- 10. Qualified (AT memory expansion up to 4MB) \$336
- 11. Qualified (AT P/S opt, 4 megs serial ports) \$110

PERIST

- 12. PC Short Memory (0-384K) 4"x5" short card \$132
- 13. PC Short Color (4"x5) short card \$136
- 14. Mono Combo Card (0-384K) P/S monochrome opt. C/C \$347
- 15. Color Combo Card (0-384K) P/S opt. C/C \$347

TALL TREE SYSTEM

- 16. J-Ram 1 (4-256MB) opt. P/S, C/C \$154
- 17. J-Ram 1 (4-256MB) opt. P/S, C/C \$208
- 18. J-Ram AT 1 (4-256MB) opt. P/S, C/C \$208
- 19. J-D-Suite (Co-processor card for 12MB drives) \$266

STA

- 20. Rig Plus II (0-384K) S/P, C/C, G \$219

TECHMAN

- 21. Graphics Master \$459

MONITOR ADAPTORS

MONOCROME

- 1. IBM PC Monochrome adapter \$240
- 2. STB Monochrome w/ parallel \$170
- 3. HERCULES Graphics card (EISA compatible) \$218
- 4. PERIST Monochrome card w/ parallel \$164
- 5. EVEREX Graphics pacer (Mono/FDC short card) \$310
- 6. EVEREX Edge (16 shade high res monochrome) \$315

COLOR

- 7. HERCULES Color card (short color card w/ P) \$190
- 8. PERIST 800 card 115 shades color, super high res \$174
- 9. SIGMA DESIGNS 400 (16 shades, super high res) \$455
- 10. IBM Enhanced Graphics Adapter \$525

COLOR MONOCROME

- 11. PARADISE Mono Graphics (AT P/S, G, 180-D-384K, C/FDC) \$324
- 12. STB Graphics Plus 1 (mono color P/44K buffer, opt. C/C) \$394
- 13. EVEREX Graphics Edge (mono color 132 color, 1000) \$515

MONITORS

MONOCROME

- 1. AMDEK 300A Amber (1000 x 768) w/ Hercules Color \$138
- 2. AMDEK 310A Amber 11L, rapid, non-glass tube \$126
- 3. IBM Monochrome green TTL input, non-glass tube \$285
- 4. TAXAN 121 121 amber or green TTL, non-glass tube \$128
- 5. PRUNICOR GRAPHICS Max 12L amber 11L, 800 pixels \$169

HI-RES COLOR

- 6. AMDEK 300 (1640x240 RGB w/ red button, audio) \$469
- 7. PRUNICOR GRAPHICS Hi-12 (1640x240 RGB) \$449
- 8. TAXAN 420 420 (1640x240 RGB, 1 color, free) \$446
- 9. SONY Super fine pitch graphics 1600x240 pixels w/ cable \$565

SUPER HI-RES COLOR

- 10. PRUNICOR GRAPHICS Hi-12 (1640x250) \$550
- 11. AMDEK 110 (1700x480 RGB, non-glass non-flicker) \$575
- 12. TAXAN 440 440 (1700x480 RGB, non-glass non-flicker) \$575
- 13. PRUNICOR GRAPHICS SK-12 (1680x480) \$675
- 14. IBM Color monitor \$640

TAPE BACKUP SYSTEMS

- 1. EVEREX 20MB 1/2" Tape backup system \$644
- 2. EVEREX 45 60MB 1/2" Tape backup system internal \$644
- 3. IRWIN MAGNETICS 10MB Tape internal \$489
- 4. IRWIN MAGNETICS 20MB Tape internal \$599
- 5. EVEREX 45 60MB 1/2" Tape backup system external \$640

CHIPS

- 1. 64K set of n/m \$10
- 2. 256K set of n/m \$10
- 3. 128K set of n/m (AT Ram) \$40
- 4. 8087-2 (Math coprocessor) \$125
- 5. 6087-3 (Math coprocessor IBM PC) \$175
- 6. 6087-3 (AT coprocessor) \$190

SYSTEM ACCESSORIES

- 1. 135 Watt Power Supply \$69
- 2. 150 Watt Power Supply \$118
- 3. 504 PC compatible printer cable \$26
- 4. 511 KEYTRONICS keyboard \$196
- 5. Surge protectors (4-6 outlets) 4 3/4, 6-552
- 6. AT Upgrade crystal (increase speed from 10MHz to 15MHz) \$50
- 7. Printer Buffer \$125
- 8. Remote Access (Private access modes) \$221
- 9. Formatting Software for Hard Disks (4 to 70 MB) \$75

DISKETTES/CARTRIDGES

- 1. OYSAN DS 00 10 529
- 2. OYSAN DS 00 high density AT 286 diskettes 10 550
- 3. MAXELL DS 00 10 550
- 4. MAXELL high density AT 286 diskettes 10 550
- 5. 3M 1/2" cartridge 450 525
- 6. 3M 1/2" cartridge 600 528

PRINTERS

CANON

- 1. PW 1000A 1180 CPS narrow car page dot matrix \$339
- 2. PW 1150A 1180 CPS w/ dot car page dot matrix \$448

EPSON

- 3. FX 85 1180 CPS narrow car page dot matrix \$349
- 4. FX 165 1180 CPS wide car page dot matrix \$499

OKI

- 5. OKIMAT 20 (color, ribbons, & plug-in print) \$225
- 6. ML 180 1180 CPS narrow car page dot matrix \$378
- 7. ML 180 1180 CPS wide car page dot matrix \$540
- 8. ML 184 1200 CPS wide car page dot matrix \$725

TOSHIBA

- 9. P1340 1200 CPS narrow car page dot matrix \$599
- 10. P1310 1250 CPS wide car page dot matrix \$1945

NEC

- 11. 3550 (35 CPS wide car page letter quality) \$1195
- 12. 8800 (35 CPS wide car page letter quality) \$1454

CE

- 13. THE PRINTER 3500 1050 CPS IBM Graphic Compatible \$1540

Choose others from names like: LIT, BROTHER, C, ITOR, OASIS, PANASONIC, DUNE, STAR, MICROTRON, CENTRONICS, and JUNA.

CUSTOM SOFTWARE PROGRAMMING

By MASTER PROGRAMMERS. Programs written in flexible EBASE II, for special applications. ACCOUNTING, INVENTORY, SALES, QUARY, JOB COSTING, CONSTRUCTION.

CALL US AND TELL US WHAT YOU NEED

MONTHLY SPECIALS

AT UNHANCED TO ENHANCED UPGRADE KIT, AT ADVANTAGE with 512K & SEAGATE ST-402E

Hard disk drive with 36 MS voice coil driven heads and closed loop servo positioning \$1124

PC TO AT UPGRADE KIT, 1 2MB TEAC FG 100 floppy floppy, 1 DISKETTE 1/2 inch, 5 1/4 inch, 5 1/4 inch, SEAGATE ST-402E w/ controller card and cables, 135 watt power supply \$1331

TERMS

- 1. We accept VISA, MasterCard, (no surcharge), C.O.D. qualified P.O.'s cash
- 2. C.O.D. requires cash or certified check, company check when approved, advanced deposit required
- 3. Allow one week for company check to clear
- 4. Wiring funds instructions available on request
- 5. Corporate, government and institutional purchase agreements available
- 6. All items shipped insured at shipper's loss priority
- 7. If we must ship a shipment you incur no additional charges
- 8. All products fully warranted
- 9. All items subject to availability
- 10. Prices subject to change



FAST SHIPMENT HOTLINE

OUTSIDE CA: 1-800-654-5365

INSIDE CA: 1-714-557-3903

Hours: Mon. - Fri. 8:30-5:30

Sat. 10:00-2:00

CIRCLE 326 ON READER SERVICE CARD

We are dedicated to providing you with total customer satisfaction. Our support team is available to answer your questions.



17151 Newhope, Suite 112
Fountain Valley, CA 92708

IBM is registered trademark of International Business Machines Corporation. A trademark of Computer Corporation. SUPER XT is a trademark of Super Computer Corp.

Nippon Electric Corp.'s new line of install-it-yourself microprocessors offers an inexpensive way to speed up both the PC and the PC-XT without losing software compatibility.

TURBOCHARGING YOUR WITH

Suppose you were a chip manufacturer planning to introduce a new line of microprocessors. You're not Intel, maker of the 8088 chip that powers your PC, nor Motorola, maker of the 68000 processor, so there's no guarantee that your new product line will even be noticed by computer manufacturers.

One way you might catch the attention of computer manufacturers and ensure success is to make your new product compatible with a processor, such as the Intel 8088 or the Motorola 68000, that already has a well-established niche in the marketplace. Making your chip software and hardware compatible with one of these processors ensures a large base of existing programs and machines for your processor. In addition, manufacturers of new computers will not have to redesign their machines to use your product. To compete successfully, your product, of course, should be significantly better than the existing model. It should be faster, include more instructions, and use less power, and if you're really clever, it will do all three.

That, in fact, is exactly what Nippon Electric Corp. (NEC) has done with its new line of micro-

processors, dubbed the V-Series. The first members of NEC's V-Series line, the V20 and the V30, are both software

and hardware replacements for the 8088, which drives the IBM PC and most compatibles, and the 8086, the heart of the COMPAQ Deskpro. The V40 and V50, which are due out the first quarter of 1986, are 16-bit units—superior to all but the newest chips on the market. The V60, due to appear toward the end of 1986, is an even fancier 32-bit processor with even more-impressive specifications.

The V20 and V30 are faster, have an enlarged instruction set, and are less hungry for power than their Intel counterparts. What interests most PC users, however, is not the extended instruction set itself but that these chips represent an inexpensive way to speed up the PC without losing compatibility with that expensive set of PC software available for the 8088 and the 8086.

Because NEC chips are completely pin compatible with their corresponding Intel parts, PC and PC-compatible owners can install NEC processors in their machines. I installed the V20 and the V30

THE

NEC V-SERIES CHIPS

chips in their respective machines and ran some standard PC Magazine Labs benchmarks as well as a few of my own tests. The results showed a modest, but noticeable, improvement for general programs and a significant increase for mathematically oriented software. Here are the test results (see benchmark results and sidebar) and hands-on instructions so that you can install an NEC chip into your machine.

Adding the V20 or V30

The IBM PC and XT, the COMPAQ Portable and Deskpro, the Hyperion, the Eagle PC, and the Columbia all work properly with the NEC chip. All true IBM PC clones should also work without a hitch.

The V20 will cause problems in the Texas Instruments Professional Computer, however. The problem stems from some rather critical timing loops in the TI's power-on self-test BIOS code. These timing tests are used to ensure that the programmable interval timer chip is functioning properly. Owing to the higher speed of the NEC processor, the TI erroneously times out this chip and concludes that it is not "keeping time." This error would not be a serious problem (unless the interval timer really were on the fritz) if the TI didn't then stubbornly refuse to complete its boot up. A patch for the TI BIOS is available from GFI Electronics, one of the suppliers of V20 and V30 chips.

Selecting the proper V-Series chip is fairly easy. If you have an IBM PC or XT, you require the 5-MHz V20. If not, find out from the documentation whether your computer uses the 8088 or the 8086. If yours is a true PC compatible, it will be powered by the 8088. Owners of the 8088

Benchmarking the V-Series Chips

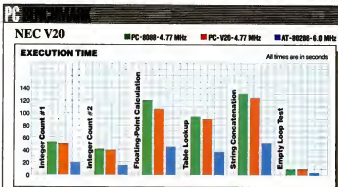
Tests reveal a modest, but noticeable, improvement for general programs and a significant increase for mathematically oriented software.

Benchmarking the speed improvement of the V20 and V30 chips is not merely a case of speeding up the processor. The extra hardware of the V-Series chips allowed significant improvement in the timings of some instructions, marginal improvement in others, and caused a few instructions to actually run slower (but only a few and only by a few clock cycles). Thus, the percentage improvement of these processors over their 8086 family counterparts depends upon the instruction mix, or how many of each type of instruction is performed.

The net result is that the amount of improvement will depend upon what type

of software you are running. Because all word processors use roughly the same instruction mix, they should all be affected the same way by the V-Series chip. Likewise for spreadsheets; but the instruction mix for spreadsheets is very different from that for word processors, so you should expect very different timings from these two applications.

The 8088 and V20 were compared by running the benchmarks on a standard IBM PC, first with the factory issue 8088 and then with the V20 inserted. For the 8086 versus V30 comparisons, a COMPAQ Deskpro was equipped the same way, first with the 8086 and then again



The V20 and V30 chips are timed against the 8086 and 8088, respectively. PC/AT times are given for comparison.

PC FACT FILE

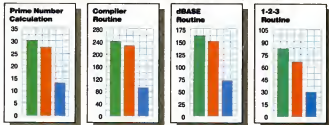
NEC V-Series chips are available from the following suppliers:

GFI Electronics
1800 Avalon St.
Olathe, KS 66062
(913) 829-0157

CIRCLE 642 ON READER SERVICE CARD

Lolir Electronics
133933 N. Central Expwy., #212
Dallas, TX 75243
(214) 234-8032

CIRCLE 641 ON READER SERVICE CARD



with the NEC V30 (all timings were made in high-speed mode). As a comparison, the same benchmarks were run on an IBM PC AT equipped with the standard 6-MHz clock. (Note that AT owners cannot use the V20 or the V30; the 80286 processor within the AT has radically different pin connections.)

All software ran identically, except for one particular version of 1-2-3 tested. The copy protection used on this disk must have relied upon some type of sector timing. With the faster processor, it could not be convinced that it was being fed anything but a bogus copy. This problem would arise in any software using such sector timing for copy protection and installed with the slower Intel processor in place; fortunately, this technique is not as widespread as it once was because it's relatively easy to break. For similar reasons, copy routines such as *Copy2PC* and *Copywrite* also have prob-

lems with the NEC's faster instruction timings.

The PC, Deskpro, and AT all use different hard disks and floppy drives, all with potentially different read and write speeds. Since I was not attempting to compare equipment configurations, all tests were run out of a RAMdisk using the same RAMdisk program in the PC and the Deskpro. VDISK was used in the AT. The effect of this was to remove all disk dependency from the tests; I could think of no truly satisfactory way of removing the minor screen output timing differences.

I used the following PC Magazine Labs standard benchmarks:

Prime number calculator: This test uses a large number of simple instructions to find all the prime numbers between 1 and 50.

Assemble, compile, link: simulates the routine typical of the normal develop-

ment cycle a programmer would encounter using a two-step DOS batch file with the IBM Personal Computer Linker program.

dBASE II routine: runs through a typical dBASE II session, including sorts, indexes, screen output, and so forth.

1-2-3 routine: a typical spreadsheet is set up and the time to recalculate (by depressing F9) was measured.

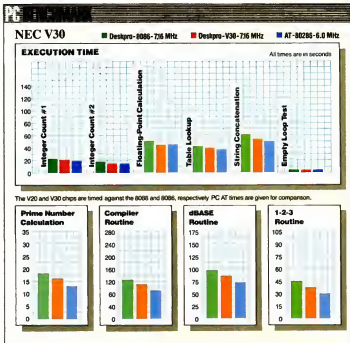
Interpretive BASIC: runs a BASICA program with six distinct routines.

Conclusion

According to NEC's documentation, you can expect a modest, but noticeable, improvement for general programs and a significant increase for mathematically oriented software. The other noticeable trend, that the V30 outperforms the V20, also holds constant for different applications and different configurations. Apparently, the engineers at NEC had difficulty forcing any more data through the bottle neck of the 8088's and V20's 8-bit data bus than was already making it through. The V20 pulled closer to the V30 in performance increase in the spreadsheet calculations where the average instruction length was somewhat longer and, hence, the bus utilization lower.

Some may not consider the speed improvements of the V20 and V30 of much interest. Admittedly, the overall 6 percent improvement of the V20 over the 8088 is not much to get excited about. If, however, your personal computer is 8088 based or gets used for calculating spreadsheets or plotting graphs and charts to any appreciable extent, then the benefits are much larger. But even the 25 percent spreadsheet improvement of the V20 and the roughly 30 percent of the V30 do not rival the ever popular turbo cards for speed enhancement, but then neither does the price. In the final analysis you must ask yourself how much a 10 percent improvement in the performance of your computer investment is worth to you. If you are like me, you will find even a modest improvement in performance worth the even smaller price tag.

—Stephen R. Davis



AT LAST, EASY, PRACTICAL GRAPHICS WITH OR WITHOUT A GRAPHICS BOARD



**INTRODUCING
MONOGRFX™
ONLY \$69.95**

- ✓ Makes it easy and inexpensive to create organizational diagrams, Gantt charts, everyday business forms and other free-form line and block drawings on your IBM PC.
- ✓ Lets you quickly dress-up any report or overhead presentation with impressive text charts, numerical tables, bar graphs, etc.
- ✓ Uses three different character sizes (in normal or condensed print) on sheets as large as 11" x 14".
- ✓ Integrates graphics and text.
- ✓ Supports most popular printers and nearly all monochrome/color graphics display adapters.
- ✓ Is truly simple to learn and use.

TRY IT RISK-FREE!

Send \$69.95 — or \$99.95 for an unprotected version — plus \$3 shipping (\$10 outside U.S. and Canada) to the address below. (Mass. residents, add 5% sales tax.)

MasterCard and VISA orders, **CALL TOLL-FREE 1-800-992-0085**. (In Massachusetts, dial 617-641-0400.)

We'll rush you your MonoGrafx software package right away. If you're not completely satisfied, just return it within 15 days of delivery for a full, unquestioned refund or credit. Our guarantee is that pure and simple.

- ☐ **YES**, please rush me MonoGrafx (version 2.1) to my risk-free for 15 days. My check, money order or company PO, is enclosed.
- ☐ I'm interested. But first, I'd like to review your demo disk and print samples. Enclosed is \$5 for a complete Evaluation Kit.

Name _____
Address _____
City _____ State _____ ZIP _____
Phone () _____ For _____

IBM PC is a registered trademark of International Business Machines Corporation.

Analytics International, Inc.
1365 Massachusetts Avenue
Arlington, MA 02174

NEC V-SERIES CHIPS

should order the V20 chip, while 8086 owners should specify the V30.

You should next note the clock speed of your system. It will probably be either 4.77 MHz (for a true PC clone) or around 8 MHz (for a turbo clone). If the processor in your machine is marked 8088-2, then you have an 8-MHz system. The NEC processors come in 5-MHz, 8-MHz, and 10-MHz versions. If your machine runs at

4.77 MHz, then the 5-MHz model is the one for you; if your system clock is between 4.77 and roughly 7.6 MHz or if you have a switchable clock whose higher speed is in this range, then the 8-MHz model is the correct processor. If your processor runs faster than 7.6 MHz, you had better order the 10-MHz part.

Why is an 8-MHz NEC processor only good up to 7.6 MHz? Do the Japanese use

How the V-Series Chips Work

These chips are faster because they have double the total transistor count of the 8088 and 8086.

According to the benchmarks, the V20 and V30 processor chips are faster than the 8088 and 8086 chips. Does this mean that an 8-MHz 8086 is faster than a 5-MHz 8086? No. If that were true, then a PC owner would have to significantly modify his hardware in order to see any improvement with the NEC processor. The V20/30 CPU is "faster" than an 8088/86 in the sense that at the same clock speed and running the same instructions, the V-Series chips get more done in a given length of time.

How is this possible? To understand why, you have to know how they work and how processors in general have evolved. All modern micros (including the 8086 and 68000 families) are known as microcoded processors. In a micro-coded machine, each assembly language instruction is taken in by the CPU and processed, one at a time, by an even lower-level program, known collectively as the microcode. These microcode instructions, often called "microinstructions," are more complex and more primitive than the higher-level assembly language instructions. The processor performs each microinstruction in one clock cycle, that is, one full back-and-forth swing of the system clock. A 4.77-MHz clock means that 4.77 million microinstructions are executed per second.

Any given instruction may take many microinstructions to perform. The typical instruction length in the 8086 family is 3 to 4 microinstructions for a simple

register-to-register operation and roughly 10 to 20 microinstructions for a register-to-memory operation; however, instruction times for some instructions, such as multiply and divide, may exceed 100 microinstructions.

CPU performance may be improved by speeding up the clock chip so that more microinstructions are executed in a given time and, therefore, more machine instructions. But since normally other chips use the same clock signal, this would necessitate some potentially severe modifications to the entire computer. The V-Series processors achieve the same result by reorganizing the underlying hardware and recoding the microcode within the chip so that the same instructions require fewer microcycles to execute.

It performs this magic by including extra circuitry within the chip, roughly doubling the total transistor count of a V20/30 over its 8088/86 equivalent. To reduce data contentions, the V chips have two internal data buses as compared with one in the Intel part. The V-Series processors also contain an effective address generator (EAG) circuit for resolving the memory address references, rather than using the 8086's slower microsubroutines. In addition, the V20 and 30 have a separate instruction prefetch pointer that allows for slightly more efficient use of the prefetch queue than is possible with the 8086's single instruction pointer.

—Stephen R. Davis

different clocks? No, NEC only guarantees a chip's rated speed if your computer's clock chip maintains a 50-percent duty cycle—the optimum for complementary metal-oxide semiconductor (CMOS) processors (a 50-percent duty cycle means that the clock is up half of the time and down the other half). Most personal computers run with a 33-percent duty-cycle clock, the optimum for the more common

processors mail order. As time goes on, I am sure that other suppliers will begin selling the chip, perhaps at reduced rates. The retail price for the 5-MHz V20 is within the \$25 to \$30 range. The V30 is roughly

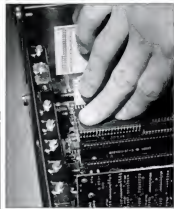
\$5.00 more per chip, and the higher-speed CPUs are slightly more expensive.

To install the new chip, you will, of course, need to locate and remove your existing processor. Before taking the cover

Why is an 8-MHz NEC processor only good up to 7.6 MHz? Do the Japanese use different clocks?

n-channel MOS (NMOS) CPUs. When driven with a 33-percent clock, the V20 and V30 will probably work up to their specified rating, but you might have problems. Most of the V-Series suppliers will probably replace a chip that can't keep up; however, if your system clock runs at the specified limit of the V-Series chip and your original CPU is not CMOS, you might be safer ordering the next faster model—these will always work and the difference in price is only a few dollars.

As of this writing, only a few computer retail outlets have the V20 and V30 in stock. Two retailers, GFI Electronics and Lolir Electronics, are shipping V-Series



Installing the NEC chip is a simple procedure.

KEEPTRACK™

NEW AND IMPROVED!

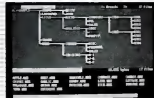
Now, the best File Management Utility offers backup and more...at no extra cost!

When we introduced KEEPTRACK, critics and customers gave it rave reviews. And with good reason:

- KEEPTRACK organizes the thousands of files on your hard disk and displays its entire contents by drawing an organization chart of directories, sub-directories and all files.

- It lets you copy, move, rename, view, and delete files without keying complicated DOS commands.
- It goes beyond standard DDS with such useful functions as sorting files, renaming directories, finding misplaced and duplicate files, changing file attributes, and revealing hidden files.

Now, we've made KEEPTRACK even better by adding new and powerful capabilities — with no price increase!



- **Backup:** Now KEEPTRACK means more than file management. It also contains a backup utility that's one of the fastest and most practical. Unlike all other backup programs, our system creates backup diskettes that have the identical file and directory structure as your hard disk's. This means you can actually work from the backup diskettes when your hard disk crashes without having to "restore" first (although KEEPTRACK does offer an excellent restore function).

- **Other Major Enhancements:** Now you can run other programs from within KEEPTRACK and perform sophisticated branch operations. DisplayWrite™ support and an expert mode are also provided.

All these new features in one integrated disk utility — and only \$79!

"KEEPTRACK BACKUP KIT" SPECIAL — SAVE \$59

As an introductory offer, you can purchase the KeepTrack Backup Kit — the KEEPTRACK program and 50 XT-formatted, labeled diskettes with disk organizer and log cards — at a special price of \$199. (Regular price is \$258.) Good through March 31, 1986. PC/AT Kit also available.

TO ORDER: Visa/MC holders, call toll free 800-628-2828, x700. \$4.00 S&H fee of \$5 will be added. To order by mail, send a total of \$244 for KEEPTRACK only at \$204 for the Backup Kit combo to: THE PINOT GROUP, 2390 El Camino Real, Suite 3, Palo Alto, CA 94306. California residents, please add applicable sales tax. For more information on KEEPTRACK, call 415-322-6151.

KEEPTRACK is not copy-protected.

KEEPTRACK includes the program diskette, a User's Manual, and a book — *Guide to Disk Organization* — that clearly explains the "why's and how's" of disk management.

Requirements: IBM PC/XT/AT, or Compatib; and compatibles with 256K under PC DOS 2.0 or higher. Works with 80MB hard disks.

24-HOUR TOLL-FREE ORDERING: 800-628-2828 x700

off your computer, make sure that you are free of static. Remove any leather-soled shoes that might scuff against the carpet to generate static electricity. Do not remove the V-Series chip from its protective anti-

static tube until you are ready to insert it into your computer. Place the removed chip into the same tube the replacement came from as soon as you have it out of the unit. Reasonable care in avoiding static is

usually all that is required.

Locating the chip to replace is fairly straightforward: look for a 40-pin dual in-line package (DIP) with the designation 8088 or 8086 on it. If the processor was not made by Intel, it may have slightly different markings, but generally the 86/88 designation will be embedded somewhere in the name printed on the processor. In the case of IBM PCs and their clones, the 8088 is at the far rear of the board, immediately in front of the keyboard connector.

When you install the new chip, before taking the cover off your computer, make sure you are free of static.

Before removing the old chip, note in which direction the half-circle groove on top of the chip points. It is this half circle that will keep you from inserting the replacement chip upside down. The best way to remove the old processor is to use a chip puller, which costs a couple of dollars at any electronics store. However, you can slide a screwdriver up under the chip and carefully pry it up, being careful not to bend the legs. You can straighten out bent chip legs once the chip is out, but be careful because they have a tendency to break.

To insert the new chip, you set it down on top of the socket with each leg sitting in the slot into which it will be going. If one or more legs do not match the hole, bend them until all do. (To bend the chip legs, you first lay the chip down on its side on a flat surface. Then while firmly holding the plastic, you push the chip down and slightly rotate it. This action will simultaneously bend all of the legs while ensuring that they all remain in line with each other.) Be sure the new chip's half-circle groove faces the same way as the old chip's. Now carefully, but firmly, depress the chip into the socket. Finally, replace the computer's cover, and that's it!

Stephen R. Davis is senior electronics systems engineer with a defense contractor in Greenville, Texas. This is his first article for PC Magazine.



EBCDIC to Lotus 123—fast, secure and automatic

Stop waiting hours for "That Girl" to download a file for you. An Emerald "i" tape subsystem, and our proprietary Tape Import/Export (TIE) software, can do the job in seconds.

Fast

IBM 3270 Emulation techniques "squirt" data through a cable. Even at 9600 baud, it's slow when you're dealing with large files. Emerald allows your PC/AT to download the data directly from mainframe tape at speeds measured in megabytes per minute. And, of course, getting data back to the mainframe is just as fast and easy.

Secure

Forget about the worry connected with passwords, who has access to what file and the concern of micros "boggling" your system down. Because downloading is accomplished off-line the micro has no access to the big computer—it can't change anything you haven't given it, and, it can't slow your system down.

Automatic

Conversion to ASCII is automatic. But our TIE software doesn't stop there. You can convert directly into Lotus 1-2-3,

dBase III, dIF and CSV. And, you can pre-select the data you download—take only the records and fields you need.

For IBM and Compatibles

The Emerald off-line "i" tape subsystem supports the IBM PC, XT, AT and true compatibles running DOS 2.X or 3.X. It is available in rack or desk top configurations, with or without automatic tape loading. Included with each subsystem, in addition to the tape drive, is the TIE software, tape controller card, cables, documentation and one year warranty.

Helpful Hint

If the downloaded files on your PC will be larger than 32 megabytes you need an Emerald hard disk subsystem. (They handle single volumes and files up to 280 MBytes.)



Emerald
Systems Corporation

Mainframe Storage for Micros

4757 Morena Boulevard
San Diego, CA 92117
(619) 275-1994
Telex: 320348 EMERSVS
Easylink: 62853804

Emerald, TIE & Mainframe Storage for Micros™ Emerald Systems Corp.

DB•Task™

Multi-User Database Application System

Until now, if you needed database management, you had two choices... learn a whole new language, or settle for a weak-featured "electronic file cabinet". Well now there's DB•Task™! The only "task-oriented" database manager simple enough for non-programmers, yet powerful and challenging enough for the seasoned database pro!

The relational, multi-file qualities of DB•Task make it simple to create up to 99 interactive applications, each with up to 99 defined "tasks", all managed transparently by DB•Task within hierarchical scrolling menus. Application development has never been so robust... so elegant!

Task Oriented

The idea behind a database manager is not only to enable the user to store and retrieve data, but to make it possible to be productive with that data... to accomplish objectives. In short, to perform tasks. That's where DB•Task comes in.

Within any DB•Task application, a "task" may be as simple as a screen full of "read only" reference information, or as complex as a 9-screen, multi-file posting job, all without programming!

However, if you WANT to program, just sink your teeth into our super-macro language using our built-in text editor. Up to 99 super-macros can be created for any one "task" and called easily from a scrolling macro menu.

Multi-User

Like any serious database manager, DB•Task has full multi-user capability, maintaining 100% data integrity while never locking a user out of files OR records! And of course, DB•Task also comes in a single-user version. All single-user applications are fully accessible by the multi-user version.

- **24 Index Fields** - DB•Task automatically maintains up to 24 sorted index paths to your data files at the time each record is added to the file. No sorting needed. Index fields may hold unique or non-unique values.
- **File Browsing** - Scan records in data files forward or backward.
- **Disk Space Maintenance** - Any disk space vacated by a deleted record is automatically reused by DB•Task. No need to "pack" or "compress" data files.
- **Macro Facility** - An extended macro language provides file access, calculations and output to screen, printer or disk file. Output to pre-printed forms, columnar layout for reports, to labels, or whatever you please.
- **Query Processor** - Powerful on-line query processor for ad hoc list and report generation, using our simple "point and select" method.
- **Cache Buffer** - File I/O is optimized by automatic cache buffer, limiting the number of physical disk accesses.
- **Crash Protection** - System crash due to electrical surges or loss of power will not affect the integrity of your data files.
- **DOS Access** - Execute DOS commands from within DB•Task.
- **Text Editor** - Built-in text editor for use in screen design, macro creation, or for notes and correspondence.
- **Printer Control** - Send any control characters to your printer with our macro language.
- **Calculator** - Pop-up four function calculator built in.
- **File Conversion** - Easily interchanges data with many other popular programs.

30 Day Money Back Guarantee

If during the 30 days following your receipt of DB•Task you are not fully satisfied, return the disks and documentation in good condition for a full refund.

(Does not apply to non-copy protected versions)

Hardware Requirements: IBM PC XT/AT; 512K RAM; DOS 2.0 or later; 80 column display (monochrome or color); two 360KB drives; hard disk highly recommended.



Single User,
Copy Protected.
Call for Volume
Discounts and
Multi-User Costs.

Credit Card &
C.O.D. Accepted.
Telephone Orders:
1-608-256-2797

Our Features Speak For Themselves

- **Parameter Driven** - No programming required.
- **Screen Manager** - Free form screen design with built-in text editor, lightning fast displays.
- **Scrolling Menus** - User-maintained menu system.
- **Multiple Screens** - Up to 9 variable size screens with up to 99 fields each allowed per "task" (891 fields total).
- **Auto Screen Advance** - Optionally set automatic screen advance, forward and backward.
- **Field Attribute Control** - User-defined data entry checking by field; Min/Max values. On screen formatting of numeric fields; Field justification; User-defined field defaults (including system date or time, or the contents of another field); Calculated fields; Invisible fields; Mandatory fields; Jumper fields (for field block control); Data option (to copy contents of field from previous record); Must-fill fields; Table look-up fields (no limit on table size); Data pull fields (retrieves data from another file for display or for input into current "task"); Optional "auto carriage return" by field; Modifiable "ped" character per field.
- **User ID** - Application access controlled by ID entry.
- **User Authorities** - Read, read/modify, read/modify/macro levels set per "task".
- **Multi-File** - Up to eight file update or posting commands may be incorporated into one "task", under full transaction processing control. If one filing instruction fails, all filing instructions in the "task" are aborted. File consistency is protected.
- **B-Tree Files** - Split second data retrieval on indexed fields.
- **Unlimited Records** - Date file size is limited only by your hardware, not our software.
- **Large Records** - Records may be up to 4000 bytes in size.

CIRCLE 316 ON READER SERVICE CARD

DB•Task		PC
QTY		
Copies, Single User, Copy Protected	@ \$99 each \$	
Copies, Single User, Non-Copy Protected	@ \$149 each \$	
Add \$5 per copy US shipping and handling, \$10 foreign \$		
Wisconsin residents add 5% sales tax \$		
Total Amount of Order \$		
<input type="checkbox"/> Check or Money Order enclosed		
<input type="checkbox"/> Please ship C.O.D.		
Charge my <input type="checkbox"/> Master Card <input type="checkbox"/> VISA 		
Account No	Expires	
PLEASE TYPE OR PRINT CLEARLY		
Name		
Company		
Address		
City	State	Zip
Phone ()	Signature	
		
Mail to: Benedat Systems Group One S. Pinckney St. Madison, WI 53703		

Get your PC on the fast track.

Supercharge!

Rev your PC up to AT power and performance with Persyst's SuperCharger™, the fastest PC accelerator board in its class. This pace-setting PC performance enhancer propels you onto another plane of computing. SuperCharger's 8086 engine will accelerate your number-crunching calculations and image-manipulating simulation up to 3 times faster and more — faster than Orchid® or Quadram®. And SuperCharger requires no special software drivers, so you can run *all* your application programs.

Stretch That Payload!

Burning up more and more memory with bigger spreadsheets and billowing data bases? Pour it on and take the lead with the new Persyst Stretch™ Memory Board. Carrying an onboard payload of 2 megabytes per Stretch module, your system's capacity goes way beyond the full 640KB! With Stretch, take full advantage of the Lotus Expanded Memory Specification so you can run the latest versions of Lotus 1-2-3™, Symphony™, Framework™, and all other memory-hungry software yet to come.

Get It Together.

Get both — and really get it on. Using Stretch with its RAM disk software and SuperCharger as your calculations accelerator, you'll breeze through even your largest database sorts. And SuperCharger's triple-speed will ripple through your spreadsheets in a blur.

Let's Roll.

Escalate your ordinary PC to truly high-class, high-performance technology — and extend your system's life for years to come.

To get moving,
call tollfree
(800)

EMULEX3;
(714)

662-5600 in
California.

Increase performance and capacity with SuperCharger™ and Stretch™.



PERSYST.

CIRCLE 362 ON READER SERVICE CARD

Emulex Corporation, 3545 Harbor Blvd., P.O. Box 6725, Costa Mesa, CA 92626
Trademarks: Orchid — Orchid Technology; Quadram — Quadram Corporation;
Lotus 1-2-3 and Symphony — Lotus Development Corporation;
Framework — Ashton Tate.

Excellence in PC Enhancements.

AN OVATION FOR NOVATION

All 2400-baud modems are not created equal. Most of these speedy communications devices have the same large-scale integration (LSI) chip set from Rockwell International as their heart. But each of the companies marketing these modems adds software and packaging to enhance the unique appeal of their product.

The attractive design and ease of use of Novation's Professional 2400 modem puts it at the head of the 2400 lineup. It also has a valuable security feature for those of you who leave your modem in the autoanswer mode.

The Professional 2400 could have been plucked off Captain Kirk's desk on "Star Trek's" *U.S.S. Enterprise*. It has a thin, white case with a sloping front that looks like it would have about a .3 drag coefficient on a formula one race car. The designers at Novation passed by the blinking light-emitting diodes (LEDs) used by other companies and provided their modem with a 2-by-3-inch liquid-crystal display (LCD) that gives you easy-to-understand messages such as "testing" and "passed test."

The modem has six front-panel operating keys that let you perform a wide variety of answering and dialing functions. You can still program the

modem with AT commands sent from the computer. It understands a string of commands that combine the traditional Hayes modem functions with Novation Smart Cat functions. But if all you want to do is set the modem to answer the phone, you can just punch the key that brings up the answer display on the LCD screen and you are ready.

You don't have to use your keyboard to transmit AT S0=1 unless you really like talking to machines that way.

The Professional 2400 has a volume control that you can easily set with your thumb. I admit that I don't change the setting of my modem's volume control very often, but late at night it's nice to be able to stop the dialing tones from echoing through the house, and sometimes I want to turn up the volume to hear what the line sounds like before con-

Competition is heating up in the crowded 2400-baud modem market.

But Novation's Professional 2400, with its appealing design, password protection, and abundance of extra features, stands out from the crowd.

nection. Using your thumb for the adjusting tool is more convenient than hunting for a small screwdriver.

The front-panel controls include a mode key to select between originate, answer, and autoanswer operation. Pushing a key labeled "Speed" allows you to choose between 300-, 600-, 1200-, and 2400-baud operation. A Data/Voice key switches the modem from voice mode (on-hook) to data mode (off-hook). Once the modem is in the data

**MOUNTAIN'S NEW
PC DRIVECARD IS
THE HARD CARD
TO BEAT! 10 OR
20MB.**



Hardly a day goes by without PC users demanding more storage and speed in less space at an affordable price.

Enter Mountain's new DriveCard.*

A self-contained 3 1/4" hard disk drive with controller on a single plug-in card that fits neatly inside an IBM® AT&T, COMPAQ® or compatible computer.

10MB...\$1.095. 20MB...\$1.195.

Unlike the other plug-in card on the market today, DriveCard gives you a choice of 10 or 20 megabytes of fast, reliable hard disk storage in a single slot. Without sacrificing one of your existing floppy disks.

Installation couldn't be easier. Simply plug DriveCard into an expansion slot inside the PC and you're ready to run. It requires no wires, leads, cables, switches or extra power supply.

DriveCard provides the same software compatibility as the factory original built-in drives, while actually improving your system's overall performance.

What's more, DriveCard is 100% compatible with DOS 2.1 and higher, PC IX, UNIX,* and XENIX.* And comes ready to support the 3COM Ether Series, Novell, IBM's PC/LAN, NESTAR, STARLAN* and other networks.

ONE YEAR WARRANTY.

DriveCard is backed by a 12-month warranty featuring "Ready Replacement" within the



first six months. If anything goes wrong, simply take it to your nearest Mountain dealer for service or return it to Mountain for replacement.

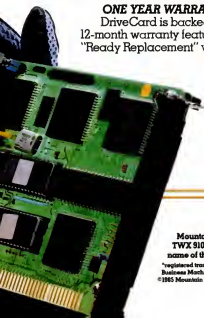
WIDE RANGE OF STORAGE OPTIONS.

Mountain offers the industry's widest range of high-performance storage upgrades. Our field-proven FileSafe™ internal and external disk, tape, Mini Mountain and combo systems are known worldwide for their outstanding value.

A ROCK-SOLID REPUTATION.

Mountain's hard-earned reputation among business users over the last eight years for responsiveness, innovation and reliability means we'll be there when you need us.

Find out today why Mountain's new PC DriveCard is the hard card to beat. Call for more information and the name of your nearest Mountain dealer.



Mountain.

THE PEAK OF PERFORMANCE

1-800-458-0300 (in Calif., 1-800-821-6066)

CIRCLE 293 ON READER SERVICE CARD

See Us at Comdex Booth #1838 in Main Hall

Mountain Computer, Inc., 360 El Pueblo Road, Scotts Valley, CA 95066, (408) 438-8650, TWX 910-598-4504. Mountain products are distributed and sold worldwide. Call or write for the name of the dealer or distributor nearest you.

*registered trademarks and *trademarks of Mountain Computer, Inc., American Telephone and Telegraph Co., International Business Machines Corp., COMPAQ Computer Corp., Microsoft Corp., and AT&T Bell Labs.
© 1985 Mountain Computer, Inc.

Where you don't have to sacrifice

HARDWARE

DISK DRIVES

TANDON TM-100-2 DS/DD	
disk drive	104.95
TEAC 55B 1/2" Height DS/DD	
disk drive 55B	98.50

HARD DISK DRIVES FOR IBM

PRIM HIGH SPEED INTERNAL HARD DRIVES FOR IBM AT	
Complete with software, Mounting rails & instructions. 30Msec Average Access Time.	
ID-40AT 512MB (43MB format)	1295.00
ID-40AT 72MB (26MB format)	1495.00
PRIM HIGH SPEED INTERNAL HARD DRIVES IBM XT w/CONTROLLER	
51MB (43MB formatted)	1495.00
72MB (26MB formatted)	1695.00

INTERDYNE

Internal 10MB tape backup for IBM PC/XT	395.00
---	--------

IOmega BERNOLLI BOX

New! Dual 20 40MB	395.00
20 MB (2-10 MB in cabinet)	2395.00
FIXT Autoboot ROM iPC only 89.95	

RODIME

10MB 3 1/2" shock mounted hard drive, Complete with controller	519.95
--	--------

TALLGRASS

Hard drive auto system with backup, New! TG-5025	2675.00
Includes Interface card for IBM-PC	

TAPE BACK UP SYSTEMS

Sysgen 45MB Internal (XT, AT)	Call
Sysgen 45MB External (XT, AT)	Call
Everex 45MB Internal (XT, AT)	895.00
Teclar QIC 60H	
External (XT, AT)	1495.00

DISPLAY CARDS

EVEREX

Graphics Edge	295.00
Edge	299.00

HERCULES

Color Card	159.95
Graphics Card (Mono)	309.95

PARADISE

Modular Graphics Card	269.95
-----------------------	--------

SIGMA

Color 400T i/Taxan 440/640	499.00
Color 400 i/Princeton SR12	499.00

TECMAR Graphics Master	469.00
------------------------	--------

MEMORY EXPANSION CARDS

AST RESEARCH

AST 6-PACK PLUS 64K	229.95
AST 6-PACK PLUS 384K	239.95
For game port option add 34.95	

ORCHID TECHNOLOGY

PC Turbo-186 w/Daughterboard	579.00
PC Turbo-186 w/Daughterboard & i8087* support board	749.95
* i807 optional	

QUADRAM QUADBOARD

New! Expanded Quadboard 64K	209.95
354K	219.95

TALLTREE SYSTEMS

J RAM-2 w/parallel, serial & clock OK	249.00
New! J RAM-3 256K	299.00
For per. ser. clock add \$120	

TECMAR

CAPTAIN-64K	194.50
CAPTAIN-384K	209.95

MEMORY EXPANSION CARD FOR THE IBM AT

TALL-TREE	Call
TECMAR	Call
QUADRAM	Call
AST	Call

64K Memory Upgrade Set	Call
256K Memory set	44.95
Intel 8027-3 for PC	109.95
Intel 80287 for AT	199.00

LOCAL AREA NETWORK

AST

AST PC Net Starter Kit	795.00
AST PC Net II Starter Kit	795.00

CORVUS OMNINET

OmniShare Software & Card	595.00
OmniDrive 20MB	2450.00
OmniDrive 45MB	3695.00
Transporter Card	369.00

QUADRAM

Quadnet IX Master Kit	1195.00
Quadnet IX User Kit	599.00
Quadnet IX Wire Center	269.00

MODEMS

ANCHOR AUTOMATION

Volkmodem 12 RS-232	179.95
Cable for PC, Compaq	11.95

HAYES

Smartmodem 1200 RS-232	369.95
Smartmodem 1200S	
with Smartcom II	359.95
Smartmodem 2400 Baud	579.95

NOVATION

1200 + Internal Modem	329.95
1200 + External Modem	329.95
Novation 2400 Modem	549.95
Includes Mite software	

QUADRAM

Quadmodem II w/Crosstalk XVI 300/1200	299.00
---------------------------------------	--------

VEN-TEL

PC 1/2 Card Modem-Internal	
w/Crosstalk XVI	369.95
1200 Plus-External 300/1200	369.95

MONITORS

PRINCETON

HX-12 RGB Color	449.95
MAX-12 Amber TX	179.95
SR-12	579.00
SR-12 w/Scan Doubler	795.00

QUADRAM

Amberchrome 12" Amber	149.95
-----------------------	--------

PANASONIC

DT-H103	Call
DT-1000G	Call

TAXAN

New! 640	499.00
808 board for 440/640	379.00
420 RGB color	419.95
425 RGB color	429.95
122-12" TTL - Amber	139.95
121-12" TTL - Green	149.95

AMDEK

600 Color RGB	399.00
710 Color RGB	439.95

New! 722 Color RGB (for EGA card)	499.95
-----------------------------------	--------

Teclar Graphics Master recommended with the 710

LASER PRINTERS

APPLE Laserwriter	Call
HP Laserjet	Call
QUADRAM Quadlaser	Call

IBM® HARD DRIVE SYSTEMS

— FREE —

90-DAY ON-SITE SERVICE
Included with XT & PC — plus
ALPHA KEYWORKS PROGRAM
Free, w/purchase of XT or PC hard drive system
Total Value! \$239!

IBM PC SYSTEMS

- IBM PC 256K + 10MB internal hard drive + 360K floppy drive

\$2095*

- IBM-PC 256K + 10MB Internal hard drive + 360K 1/2 ht. floppy + 1.2MB 1/2 ht. floppy (AT compatible)

\$2695*

IBM AT SYSTEMS

- IBM AT 256K + 360K drive + 10MB VI hard drive.

\$2295*

- IBM XT 256K + 360K drive + 10MB Internal hard drive + 10MB internal tape back-up.

\$2895*

*For above systems with 20 MB internal hard drive add \$150.



Monitor optional

IBM AT SYSTEMS

- IBM AT 512K + 1.2 MB Floppy + 20 MB hard drive

\$3895

- IBM AT 512K + 1.2 MB floppy drive + 72 MB (59.8 formatted) Prim hard drive (30 Msec).

\$4850

PLOTTERS

SWEET-P 8-pin plotter	795.00
SWEET-P 1-pin plotter	295.00

FLOPPY DISKS

	512DD	DS/DD
KODAK 5 1/4" (10 pk)	13.50	17.50
IBM 5 1/4" (10 pk)	26.95	26.95
MAXELL 5 1/4" (10 pk)	13.95	17.95
FUJI 5 1/4" (10 pk)	14.95	17.95
POLAROID DS/DD		14.95

For quantity prices, please call

PRINTERS

BROTHER	
HR-15 17 CPS	369.00
HR-25 17 CPS	479.00
HR-35 36 CPS	749.00
Tractor Feed (HR-15, HR-25)	124.95
Sheet Feeder HR-15/25	199.95

COMEX	
CR-3 23 CPS parallel	399.00
CR-IV 36 CPS parallel	599.00

CALL FOR OUR LOW PRICES.

EPSON	
6100 18 CPS Letter Quality	379.95
6300 40 CPS	699.95

NEC	
P-560 24 pin dot-matrix	999.00
8850 letter quality	Call
3550 letter quality 33 CPS	999.00
2050 letter quality 18 CPS	699.95
NEC ELF-360	415.00

CALL FOR OUR LOW PRICES.

OKIDATA	
Call us for our low prices on all OKIDATA printers.	

PANASONIC	
KCP-1091 + KCP-1092 + KCP-1093	
KCP-3131 + KCP-3131	
Call for our low prices!	

SILVER REED	
EXP-550 19 CPS	419.95

EXP-770 36 CPS	799.95
Tractor feed for EXP-550	124.95

TEXAS INSTRUMENTS	
855 with Tractor Feed	579.95
865 with tractor	749.95

TOSHIBA	
P-341	949.00
P-351 (parallel/serial)	1119.00
P1340	479.95

HARDWARE MISC.	
AMERICAN POWER	
300 PC	399.95
330 XT	449.95
450 AT	549.95

DATASHIELD POWER BACK UP	
PC-200 200 watt (for PC)	295.00
XT-300 300 watts (for XT)	399.00
AT-500 500 watts	649.00

EVEREX	
Expansion Chassis	699.00

EXAN	
Game Port	24.95
PK-5151 Keyboard	109.00

IMSI	
Mouse w/Dr. Halo II	109.95

KEYTRONICS	
New! KB-5151 keyboard	169.95

KENSINGTON	
MasterPiece	92.50

KOALA	
Koala Pad	89.95
Speed Key System	99.95

MOUSE SYSTEMS	
PC Mouse with PC Paint	139.95

SOFTWARE	
FOR TITLES NOT LISTED HERE, PLEASE CALL US FOR OUR LOW PRICES.	

on service because of the low price!

DEC. 24, 1985

COMPAQ PORTABLE SYSTEMS



- 256K
- Two DS/DD disk drives
- Built-in hi-res monitor with graphics
- Parallel printer card
- DOS

Call or write.

COMPAQ PORTABLE HARD DRIVE SYSTEMS

- COMPAQ 256K with 10MB Drive and 1-360K Floppy\$2495**
 - COMPAQ 256K with 10MB Drive and 2-360K 1/2 Ht. Drives\$2750**
 - COMPAQ 256K with 20MB Hard Drive and 1-360K Floppy\$2695**
- COMPAQ DESK PRO, **Call or write.**

INTERNAL HARD DRIVES FOR IBM PC AND XT

Internal 1/2 height hard drive, complete with controller card, ready to install 1 year warranty.

10MB \$395.00

20MB \$495.00

TURN 1 IBM-PC INTO 4

Turn your IBM PC or XT into a true Multi-user system with Multi-PC. Up to 4 users can share a single PC, running the same or different software, all under PC DOS. Ideal for the small office. **Call for low price.**

MSI CARTRIDGE BACK-UP SUBSYSTEM

Low cost high capacity 25MB cartridge tape backup system for the IBM PC/XT complete in cabinet with power supply. Connects to IBM floppy controller card. Will not use a slot in your PC. Back-up and restore internal files or an entire disk.

\$888**

- ALPHA**
Keywords "TOP RATED" 49.95
- ASHTON TATE**
D base II 259.95
D BASE III Call
Framework Call

- BORLAND**
Turbo Lighting 59.95
Turbo Pascal 3.0 36.50
Side Kick (protected) 29.95
Side Kick (non-protected) 44.95
Super Key 36.50
Turbo Pascal w/8087 support 57.95
Reflex 59.95

- BREAKTHROUGH**
Time Line Project Mgr. 259.00

- COMPUTECH**
Naw! Pony Express XL 149.95

- FISCHER INNES**
Watchdog Security Program. 239.95
(Requires hard drive)

- FOX & GELLER**
Quickcode III 149.95
Quick Index Call
Quick Report 149.95
Dutil III 1/2 Base III 49.95

- FUNK SOFTWARE**
Sideways 39.95

- GNP**
CPA+ 349.95

- INFOCOM**
Cornerstone 259.95

- INNOVATIVE SOFTWARE**
Smart Software System 495.00

- KOALA**
Executive Presentation 99.95

- LIFE TREE**
Volkswriter Deluxe 159.95

- LIVING VIDEOTEK**
Think Tank (req. 256K) 99.95
Ready 59.95

- MECA**
Managing Your Money 99.95
Jim Fixx Running Program 44.95

- MENLO PARK**
In Search 299.95

- MICRO PRO**
Wordstar Pro Pack 239.95
Wordstar 2000 239.95
Wordstar 2000 Plus 299.00

- MICRORIM**
R Base 5000 339.95
New! Clout 2.0 139.95

- MICROSOFT**
Chart Call
New! Flight Simulator 34.95
Multiplan 119.95
Word 2.01 249.95
Project Call
Access Call

- MICROSTUF**
Crosstalk XVI 99.95
Remote 109.95

- MONOGRAM**
Dollars and Sense w/forecast 109.95

- MULTIMATE**
Multimate Version 3.3 229.95
Multimate Advantage 295.00

- NANTUCKET**
Clipper 1/2 Base III 394.95

- OFFICE SOLUTIONS**
Officewriter/Spell 249.00

- PETER NORTON**
Norton Utilities 3.0 49.95

- POWER BASE SYSTEMS**
Power Base 2.1 199.95

PROGRAMMER'S CORNER

- Lattice-C Compiler 299.95
- P-Fix 86 Plus Debugger 299.95
- Morgan Prof. Basic 79.95
- Lattice Windows 219.95
- Trace 95 99.95
- Panel for Lattice-C 219.95
- P-Mate Text Editor 159.95
- B-Trieve 195.50
- Plink-95 Overlay Linker 299.95
- X-Trieve 169.95
- Mark Williams C 395.00

QUATERDECK

- Desq 139.95

ROSESOFT

- Prokey 3.0 74.95

SOFTELOGIC SOLUTIONS

- Double DOS 84.95

SORCIM

- Supercalc 3 Release 2 169.95
- Super Project 169.00

SOFTWARE PUBLISHING

- PFS FILE 84.95 PFS Graph 84.95
- PFS Report 79.95 PFS Write 84.95
- Harvard Total Proj. Mgr. 294.95

IBM PCjr. CORNER

- KOALA Koala Pad Touch Tablet for PCjr. with software \$34**
- TECMAR PCjr. Captain 128K w/Parallel Port \$129**

47st. Computer

Computers and Business Equipment

67 W. 47th St. • 115 W. 45th St.
NYC CA LIC. # 800189 / 691860 NYC CA LIC. # 800191

116 Nassau St.
Computer Annex around the corner, 39 Ann Street

Mail Order Address: 36 E. 19th St., New York, N.Y. 10003

IN NEW YORK **1-212-260-4410**

STATE CALL **1-800-221-7774**

TOLL-FREE **1-800-221-7774**

OUT-OF-STATE

NASSAU STREET STORE

1-212-608-6934

45th and 47th St. STORES

1-212-398-1410

Store Hours: Sunday 10-4, Mon. thru Thurs. 9-6, Friday 9-2

- No surcharge for credit cards
- Prompt and efficient service
- Knowledgeable and experienced sales staff.

We accept MC, Visa, American Express & personal checks (no delays if approved). Minimum shipping and handling \$5.95. Software found to be defective will be replaced immediately. Defective hardware will be repaired or replaced at our discretion within the warranty period of manufacturer. Defective items must be sent to 36 East 19th Street, New York, N.Y. 10003. Att: Service Dept. Prices herein are for mail and phone orders only. Store prices may differ. Some items are subject to availability. Due to manufacturers price fluctuations, the prices may change beyond our control. This ad supersedes all previous PC ads. Not responsible for typographical errors.

Keep in touch with the latest items on the market and our up-to-date sale prices by checking our weekly ads in the National editions of the N.Y. Times and Wall Street Journal.

IBM is a registered trademark of International Business Machines Inc.
PC Magazine: Dec. 24, Submitted Nov. 4, 1985

CIRCLE 106 ON READER SERVICE CARD

GRAPHWRITER

THE WORLD'S GREATEST LIBRARY OF
CHARTS AND GRAPHS.



PROFESSIONAL 2400

mode, you can use the Data/Voice key to switch between data and voice applications. While you are using these keys, the LCD display clearly indicates the functions you select.

Each time you turn on the Professional 2400, it goes through a self-test routine. The self-test examines the signal quality, signal strength, and other internal factors. As the modem passes each self-check, it plays a different musical tone and displays a signal-quality bar in the LCD display.

Plug-in Intelligence

There is a lot of maneuvering in telecommunications among companies trying to set standards on which pieces of equipment should perform which functions. Some argue that modems should do such jobs as exchanging link level, "I'm OK, you're OK" signals for error detection and correction. Others say that software to do these jobs is cheaper. No matter which school of thought you graduate from, the Professional 2400 will try to please you.

The Professional 2400 has an auxiliary program module that slips into the huck of the modem. This module contains ROM chips with appropriate program code and many switches that replace the internal switches in most Hayes-compatible modems and add switching flexibility. This module will be available with the X-PC and MNP link level protocols and other features as the market calls for them. You can use this ability to perform a plug-in upgrade to teach an old modem new tricks.

The present model of this Novation modem will not execute some of the new commands that Hayes Microcomputer Products has added to its latest 2400-based Smartmodem. This should not limit the use of the standard Novation device unless you absolutely must have one of the new commands. If you want to add all of the Smartmodem 2400 commands, Novation can provide a feature module that will do this for an added cost.

Many modems can dial telephone numbers under software command, but only a few modems have the ability to detect a dial tone. Most modems simply wait a period of time after going off-hook to send out their tones. Under some conditions they can send tones down a telephone line that is not ready for them. The ability to de-

FREELANCE

PRESENTATION GRAPHICS, UNLEASHED.

text a dial tone is particularly useful when you are working through a private branch telephone exchange that might experience varying amounts of delay getting a trunk line. The Professional 2400 can sense when a dial tone is present and wait to send its tones. It can also combine tone- and pulse-dialing in the same command set. This gives you the ability to use tone-dialing services like MCI and GTE Sprint even if you are calling through an old pulse-dialled exchange.

Similarly, most modern modems can answer a ringing telephone line. But the use of an autoanswer modem may invite autodial mischief. The overfriendly modem can be abused by anyone calling in with less-than-friendly intentions. The Professional 2400 has a valuable and unique feature that allows you to set into the modem a password that all callers must enter to access the system. If the caller sends the right password (up to eight characters) within the acceptable time, the modem sends the appropriate connect and carrier-detect signals to the computer, but it gives no indication to the caller. If the caller does not provide the right password or if a programmable time limit expires, the modem hangs up.

Modern 2400-baud modems conform to a transmission standard established by the Comité Consultatif International Télégraphique et Téléphonique (CCITT) called V.22bis. This standard calls for modems to have the ability to test the telephone line to determine if it can be used for 2400-baud operation. When they initiate a communications session, V.22bis modems transmit a preestablished pattern of data. This data pattern helps each modem to find problems in the line and to attempt to automatically adjust for these problems within

REACH FOR THE SKY

It's minutes before the big presentation. You're all pumped up. You're ready to go. Nothing can hold you back.

If, that is, you've got Graphwriter and Freelance. Two graphics software packages for your IBM® PC or compatible that put more energy into your presentations than anything else on the market today.

Graphwriter gives you all the charts and graphs you're ever likely to use in a presentation. Everything from bar charts to Gantt charts to organization charts.

They don't just show the facts. They transmit your ideas to your audience with a visual intensity that reaches all the way to the guy in the back row.

Freelance gives you all the rest. It lets you customize your existing Graphwriter, Lotus® 1-2-3® and Symphony® charts for maximum impact.

Increase the size. Drop in text. Pull in arrows, trucks, human figures and a host of other useful symbols. You even get the freedom to create your own logos, diagrams and other original drawings.

Both Graphwriter and Freelance also do a dynamite job on word charts, which many packages leave out.

And best of all, they can work with each other. Individually, they're the most powerful presentation graphics packages available today. Together, they're all the presentation graphics software you'll ever need.

Take your presentations higher. Call today for the full story on Graphwriter and Freelance.

617-890-8778

CIRCLE 376 ON READER SERVICE CARD



Novation's Professional 2400 modem.



GRAPHIC COMMUNICATIONS, INC.
200 Fifth Avenue
Waltham, Massachusetts 02254

PROFESSIONAL 2400

certain limits. Manufacturers differ in how they perform the process of adjustment to the telephone line, called adaptive equalization, but modems from different manufacturers can still communicate together.

If the modems cannot adjust to match the line conditions for 2400-baud transmission, they will step down to slower standard speeds such as 1200 baud. This automatic step-down can be a useful fea-

ture, but it can also result in frustration and confusion for the person trying to use the modem to communicate.

The serial port in a PC acting as a terminal is set for a certain speed by the communications software running in the PC. If the speed of the PC and the speed of the modem operating over the telephone line are not the same, the communication will be garbled. If the two modems on a circuit find they cannot communicate at 2400 baud and agree to step down the transmission speed over the phone line, the operating speed set into the RS-232C port of the computer at either end will not be correct. The person looking at the screen of one of these computers could become very puzzled because of the strange characters and letters displayed.

The Professional 2400 attempts to get around this speed mismatch problem when it steps down its speed by sending the message "Connect 1200" to its attached computer at 2400 baud. The message should appear on the screen properly and prompt the person using the machine to change the communications program to 1200 baud operation. This step-down feature can be disabled, but then a bad telephone line can cause transmission problems. If you are operating with programmable communications software such as *CROSSTALK*, *Microsoft Access*, or *Softem PC*, it is possible to set up commands that will slow down the communications software in response to the prompt from the modem.

Torture Test

To determine how practical this 2400-baud modem is for long-distance communications, I conducted a couple of torture tests. The Tymnet packet-switched network has established 2400-baud dial-in ports in cities across the nation. I regularly use the local number to test modems and software with the X.25 protocol.

PC FACT FILE

Professional 2400

Novation Inc.
20409 Prairie St.
Chatsworth, CA 91311
(800) 423-5419
(818) 996-5060

List Price: \$895 with software; \$795 without software

CIRCLE 666 ON READER SERVICE CARD

200,000 PC-FILE III USERS ARE ABOUT TO EXPERIENCE MORE POWER AND SPEED THAN THEY EVER THOUGHT POSSIBLE . . .

Now, with the legendary **PC-FILE**, Jim Button has included integrated word processing (with mail merge), relational retrieve capabilities, and "pop up" help screens - all in one package called **PC-File/R**.

YOU'LL LOVE THE POWER

Work with several databases at once. Search multiple fields. Take advantage of expanded reporting formats and improved flexibility. Set up impressive keyboard macros. Speed up data entry. Learn from the examples and figures in the expanded and enhanced manual.

THE NEW STANDARD

Combine all of that power with calculated fields, lightning fast binary searching, DOS subdirectory support, and the ability to exchange data with other programs (1-2-3, WORD, Wordstar, dBASE, PeachText and Word Perfect) and you have the new standard in multi-faceted database programs.

THE RIGHT PRICE

The best part of all about **PC-File/R** is that you'll learn how to use it fast. And, it's very easy to use, too . . . just like **PC-File III**. ButtonWare's commitment to affordable software prices continues on with **PC-File/R**. Registered users can upgrade for \$99.00. New customers can buy it for \$149.00. Ask your dealer for it or order it from us.

If your local computer store doesn't have PC-File/R, ask them to order it. OR Call 1-800-JBUTTON to place your order. Mail orders will be processed within two to three weeks and will also include a \$5.00 shipping and handling charge.

**JIM BUTTON
MEANS BUSINESS**

CIRCLE 343 ON READER SERVICE CARD

As a test of long-distance communications, I used the Professional 2400 to dial from Washington, D.C., to a Tymnet number in Denver, Colorado. At various times I used AT&T, SBS, and MCI long-distance services to make the connection and entered MCI Mail through Tymnet. I dumped a 2K-byte text file into Tymnet through all three carriers and experienced no problems.

As a further test, I dialed a PBX system in Denver and had the PBX redial the local Tymnet number. This interconnection is typical of configurations that might take place in corporate telephone systems. Although the connection sounded less clear to my ear, the modem had no problem passing the data to MCI Mail at 2400 baud.

These tests are hardly laboratory benchmarks, but they prove to me that this 2400-baud modem at least is not oversensitive to transmission conditions and can be used at full speed on long-distance circuits.

The Professional 2400 also is not sensitive about what communications software it works with. I fed it data with *CROSS-TALK XVI*, *CROSSTALK Mark 4*, *Micro-Soft Access*, *PC/InterComm*, and *Softerm PC*. All of these programs could put the modem into the autoanswer and autodial modes and work at 2400 baud.

Novation sells the *MITE* communications package from Mycroft Labs for use with the Professional 2400. *MITE* is a plain-vanilla program that doesn't do much more than communicate well. However, *MITE*'s simplicity is its strength. You use the program by working your way through a few clear and simple menus that provide you with a nearly automatic selection of alternatives. If you don't want to use 7-bit data words, you simply touch one key and the selection changes to the next most logical one (8 bits). I was connected to a remote system about 90 seconds after booting the program, and I had never seen it in operation before.

MITE allows you to store and recall complete communications profiles for services you regularly call. The phone numbers and transmission parameters are associated with the name of the service you want to call. My only complaints about *MITE* are that you can't easily see the pre-stored profiles you can select from and that the program clears the data screen when

you go out to a menu and return.

Novation markets *MITE* as an optional accessory for the Professional 2400, but your favorite PC communications program should work with the modem.

The Professional 2400 is a good-looking and practical high-speed modem. Its extra features and password protection make it a particularly attractive communications value. ■

Org™ makes Organization Charts... Quickly

Announcing Org, to give you the advantage of an up-to-date, professional looking Organization Chart... no matter how often it changes

Your organization chart is a powerful tool to communicate company structure and change. Yet new charts are often coming to make and revise. Often they are out-of-date and poorly drawn.

Now there's Org—a program for the IBM PC and compatible computers.

Org dramatically reduces the time it takes to create and maintain your organization chart.

Just Enter Names

Simply type names, titles and comments into a display that shows each manager and his or her direct subordinates.

Now Org does the hard work.

Draws Automatically, Professionally

Org automatically draws and spaces the boxes, centers the text and precisely lays out the connecting lines. For a chart of 25 employees this involves over 23,000 separate calculations. (No wonder it takes the entire afternoon to make one by hand.) With a typical printer you have your chart in about 3 minutes.

Your printed chart is clean and exact.

Org works on any IBM PC/XT/AT or 100% compatible computer with 383KB of RAM, DOS version 2.0 or higher and a printer are required. Org is not copy protected. A 60 page User's Guide and telephone support are included. IBM is a registered trademark of International Business Machines Corp. ©1985 Banner Blue

Banner Blue 5278 Reeder Court, P.O. Box 7865, Fremont, CA 94537, Phone (415) 794-6850 PC 1724

Send me a copy of Org. I want my organization chart to be up-to-date and professional looking. Org has a 30 day money back guarantee if I am not satisfied for any reason.

\$69.95 plus \$3.00 shipping. CA residents add \$4.55 sales tax. Outside USA add \$10.00 and make payment in US dollars drawn on a US bank.

☐ Check ☐ MasterCard ☐ Purch. Order
☐ VISA ☐ American Express

Card No. _____ Expires _____
Name _____ Signature _____
Company _____ Phone _____
Shipping Address _____
City _____ State _____ Zip _____ 0

CIRCLE 367 ON READER SERVICE CARD

HARD DRIVE PRICE BREAKTHROUGH

STARTING AT \$249.95!

complete easy to install internal and external systems
— will boot just like an XT — fully warranted —
same day shipping from stock — fast service — free technical assistance

\$499.95 to \$999.95

STREAMING OR FLOPPY TAPE BACK UP SYSTEMS

complete internal and external systems

\$1,995.00 — IBM XT WORKALIKE SPECIAL

NOW 40% FASTER—4.77 AND 6.88 MHZ SELECTABLE!

20 megabytes — one floppy — 640K — clock calendar — serial port — parallel port
monochrome card — monochrome monitor with tilt and swivel base
Keytronics 5151 style keyboard — one year warranty — shipped from stock

MEGADISK™ HARD DISK DRIVE SYSTEMS

For the { IBM/PC, Tandy 1000, TRS/80 Models I/III/IV/4P, Compaq, PC Workalikes, Color Computers, Heath/Zenith, Max/80

{ Complete with Hardware, Cables, Software and Quikfit Installation

5 Megabytes Internal Mount	starting at \$ 249.95
10 Megabytes Internal Mount	starting at 439.95
20 Megabytes Internal Mount	starting at 879.95
5 Megabytes External System	starting at 449.95
10 Megabytes External System	starting at 579.95
20 Megabytes External System	starting at 699.95
Tape Backup System — Internal Or External	starting at 449.95

DOS Systems Available: { IBM/Heath — DOS 1.0, 2.0, 2.1, 3.0, or later
{ TRS/80-LDOS, TRSDOS 6.x, Newdos/80, Dosplus, CP/M, COCO DOS, Max/80 LDOS, OS9

FULLY WARRANTIED — PARTS AND LABOR — 24 HOUR SERVICE — CALL TOLL FREE — 1-800-343-8841

IBM ENHANCEMENT CARDS

Multifunction with 384K	\$199.95	Color graphics	\$139.95
Serial port, parallel port		Monochrome/RGB Color	229.95
Clock calendar, game port		Disk controller with cable — up to 4 drives	79.95
Serial port — two port	69.95	384K memory card complete	129.95
Monochrome only	99.95	Hard drive controller	159.95
Monochrome graphics w/parallel port	139.95	Keytronics 5151 style keyboard	129.95
Network card	249.95		

DEALER INQUIRIES INVITED

CALL 1-617-872-9090

PRICES CHANGE EVERY DAY

CALL 1-800-343-8841

PC

© 1985 SOFTWARE SUPPORT, INC.

1 Edgell Road, Framingham, MA 01701 (617) 872-9090 Telex-383425

Hours: Mon. thru Fri. 9:30 am to 5:30 pm (E.S.T.) Sat. 10 am to 3:30 pm

SERVICE POLICY — Our Professional Technical Staff is Available To Assist You Monday Through Saturday.

WARRANTIES — Up To One Full Year Parts And Labor. Floppy Disk Drive Power Supplies — Five (5) Years.

SERVICE — 24 Hour Turn-A-Round On All In-Stock Parts. Dealer Inquiries Invited. Call 617-872-9090

Please Call For Shipping,
Handling and Insurance.

CASH DISCOUNT PRICES

Toll Free 1-800-343-8841

Please Call For Our Latest Price Saving Specials.

Not Responsible for Typographical Errors.
Prices and Specifications May Change
Without Notice.

FOR READER SERVICE CALL TOLL-FREE 1-800-343-8841

BANISH TYPOS WITH SPELLING CHECKERS

Tell the truth: You never won a spelling bee. And now that you have an important memo to draft, you're developing ulcers at the thought of even a single misspelling. Relax, help is available: software that checks your documents for correct spelling. While there's no substitute for careful proofreading, which requires human judgment, in many respects a spelling checker can be more accurate than the human eye. Even careful readers will miss mistakes occasionally, and the longer the document, the greater the chance for error. Not so with a spelling checker—if you typed *banina* instead of *banana* on page 34, you can bet it will pick it out. Although no spelling checker will catch the use of the wrong homonym, *there* for *their*, for example, using a spelling checker is guaranteed to reduce the number of UFWs (Unidentified Fictitious Words) in your documents.

Spelling errors
and typos can
undermine your
carefully chosen
words faster
than you can say
you're sorry.
These eight
software
programs
mean you'll
never have to.

Many word processors feature integrated or add-on programs for spelling, including *WordStar*, *Microsoft Word*, *WordPerfect*, and *MultiMate*, for example. But standalone proofreading software offers you the opportunity to unite the word processor of your dreams with the spelling checker of your dreams.

PC Magazine took a critical look at eight standalone spelling checkers for the IBM PC. Who won our electronic spelling bee? The answers follow.

We evaluated the programs for ease of

use, flexibility, speed, overall program size, thoroughness, and accuracy. Since spelling checkers vary somewhat in capabilities, we needed a standard for comparison to evaluate them fairly. We developed a 20K-byte test file with 68 certified errors for the programs to check. The errors were spread out both in the file and in the alphabet, so that a typo or misspelling beginning with *b* might be followed by one starting with *t*. The typos varied from one to three incorrect letters per word.

To make the speed comparisons valid, we chose mostly words common to all products' lexicons. We included a few ringers, however, to test the breadth of the dictionaries. We included some difficult phonetic misspellings like *pressint* (for *present*) to test the programs' look-up methods. The bulk of the spelling errors share the same few simple problems: two transposed letters or one wrong letter, for example. Many programs can find misspellings only if they're based on these errors, and this drawback can be serious if you are trying to correct true spelling mistakes as well as typographical errors. The sample text (a large excerpt from the *Meditations* of Marcus Aurelius combined with the rantings of a *PC Magazine* reviewer) also included several proper nouns and possessives, which showed up as errors in all but a few programs.

The times given for each product are for loading the sample file and checking it





**MAIL AND PHONE
COMPONENTS & SYSTEMS
ELECTRACOMP, INCORPORATED**

ORDER PHONE 1-800-237-5595 9 AM-7 PM

IBM (256K) DRIVE	1515	QUADRAM	479	PRINTER 6100	360
1610	MONITOR QUADCHROME	237	TRACTOR 6100	105	
	MICROFAZER BUFFER (64K)	132	PRINTER 6300	685	
		472	TRACTOR 6300	125	
		319			
			NEC PRINTERS	1001	
			SPINWRITER	421	

	IBM (256K)	1515
IBM PC SINGLE DRIVE		1610
IBM PC TWO DRIVES		1695
IBM XT SINGLE DRIVE		1995
IBM XT D500 & 10MB HD		3360
IBM AT ENTRY LEVEL		
ALSO COMPATIBLES AVAILABLE		
ZENITH COMPAQ GOLDSTAR		

QUADRAM
MONITOR QUADCHROME
MICROFAZER BUFFER (64K)
MICROFAZER BUFFER (BK)
QUADMODEM
QUADMODEM II
QUADSPRINT BOARD
QUADBOARD (OK)
QUADPORT FOR AT
QUADMEG EXPANSN BOARD
QUADMEG BOARD FOR AT

479	PRINTER 6100
237	TRACTOR 6100
132	PRINTER 6300
472	TRACTOR 6300
319	
418	NEC
240	3530/3550 S
110	E L F 350
	TRACTOR

R MICRONICS PRINTERS
NI 10
NI 15
TOSHIBA
351

PRINTER 351
FLOPPY DRIVE

292	FLOPPY UNIT		
135	PLOTTER MODEL 6120	GOULD	807
283	GENERAL INTERFACE SYSTEMS		782
349	BATTERY BACKUP		
186		KENNSINGTON	9
349	MASTERPIECE		
460			

BATTERY BROS
KENSINGTON
MASTERPIECE
ORDER PHONE FOR ORDERS ONLY
FOR OTHER INQUIRIES CALL
(B13) 000-0000 OR TELEX
750025 (RVAN SARA UD)

TECMAR BOARDS
CS MASTER

60 TAPE OR FOR AT

QIC 60 14P
VU TEK BOARDS
MONOGRAPH
COLOR

MONOGRAPH
ECONOCOLOR
ECONOMONO
MONOGRAPH PLUS
PARADISE BOARDS

PARADISE BOARDS

5 PAK
MULTI DISPLAY
MODULAR GRAPHIC

409 MODULAR GRAY
804 STB
236
120 CHAUFFER
PERSON PRINTERS

120 CH... EPSON PRINTERS
EX-85

145 FX-85
329 FX-185
1 X-80

329 LX-80
LX-90
228 LQ-1500

228 LQ-1500
125 SILVER RECO
325 400 P OR

325	PRINTER	400
122	TRACTOR	550 P OF
285	PRINTER	550

285
245

PRINTER
TRACTOR

550

PAYME

accepted with 15% deposit. PAYM
on American Express, Diners
at the time of submit

5: prices are correct at the time of sale. All items are covered by a 90 v
without authorization and

VICE CARD
HOD STREET

SERVICE CENTER
2 ROBIN HOOD STREET (81)

10

ORIVES
PEACHTREE
ARD ORIVE FOR AT 20
ORIVE FOR AT 30

10 MB HARD DRIVE
HARD DRIVE

SEAGATE
10 MB HARD DRIVE
20 MB HARD DRIVE

20 MB HARD DRIVE
SIGMA DESIGNS
10 MB HARD DRIVE

10 MB RAM
RANA 2000 DRIVE

TANDON
TM100 2 FLOPPY DRIVE
DRIVES

TEAC DRIVES
F055B 1MB FLOPPY

F0558
F MODEL 1MB FLOP
TALLGRASS
5025

TG 5025
TG 9A BOARD
TG 4060
CG BOARD

TG 09 BOARD
MICROSCI
HARD DRIVE

10 MB HARD DRIVE
RAMBO BOARD
MINISCRIBE

MEGA	122	PRINTER	400	P OR S	122
B40	1/0 MINI	285	TRACTOR	550	
	GRAPHPAK	245	TRACTOR		
	1/0 PLUS				
3010	MEGA				
52	SIXPAK				
386					
228					

ORDERS: \$100 minimum order. CDD orders accepted with 15% deposit. PAYMENT: Visa, Mastercard, money orders and checks accepted with no surcharges. 3% surcharge on American Express. DINERS Club and COD orders. Purchase orders accepted from qualified accounts. PRICES: prices are correct at the time of submission for publication and are subject to change without notice. SALES: All sales are final. All items are covered by a 90 day warranty and some manufacturers warranties are longer. RETURNS: Returns are not accepted without authorization and are subject to a 15% restocking charge.

CIRCLE 497 ON READER SERVICE CARD

2012 ROBIN HOOD STREET, SARASOTA, FL 3358
(813) 921-6040

2012 ROBIN HOOD STREET, SARASOTA, FL 33581
(813) 921-6040

SPELLING CHECKER ROUNDUP

against its dictionary for unrecognized words. Since correcting errors is in each case an interactive process, the time it actually takes to produce an error-free document is largely up to you.

The Word Plus

The *Word Plus* from Oasis Systems is the old-timer of the products tested. The program has been around since the dawn

of computing (sometime just after the creation of *WordStar*), and its lack of a fancy (or even colorful) screen display reflects its deep roots. But despite some minor signs of age, *The Word Plus* performed quite well in comparison with most of the challengers, compiling and checking through the 20K test file in only 36 seconds.

The *Word Plus* comes on a single floppy disk that contains all of the various in-

Stalking the Elusive Synonym

Three on-line thesauruses try to win the synonym-finding contest, but the one that gives you the most right answers won't work within your word processor.

Wouldn't it be nice, I've often mused, if an on-line thesaurus were a mere keystroke or two away? The software industry works in wonderful and mysterious ways, and there's a product on the market to fit every fantasy, or at least to try. Three thesauruses-on-a-disk currently available to PC users have vied to fit mine: the one included with IBM's *Word Proof II* (see the accompanying review), *Word Finder* (\$79.95 from Writing Consultants Inc., 300 Main St., East Rochester, NY 14445, (716) 377-0130, requires 64K RAM, one disk drive, DOS 2.0 or later), and *The Random House Reference Set* (\$69.95 from Reference Software Inc., 2363 Boulevard Circle, Walnut Creek, CA 94595, (415) 947-1852, requires 64K RAM, one disk drive, DOS 2.0 or later).

Word Finder and *The Random House Reference Set* are RAM resident. They work within your word processor, popping up and scanning for the word the cursor is on at the touch of a predefined "hot key." *Word Proof II*, on the other hand, is a standalone program. It requires you to leave your word processor, load the file you want to work with into its own built-in (and remarkably functional) text editor, and use designated function keys to look up the words you want.

Both the standalone and the RAM-resident approach have advantages and disadvantages. The two RAM-resident programs, *Word Finder* and *The Refer-*

ence Set, allow you to find synonyms without breaking your train of thought. But in a test of 20 randomly chosen words, *Word Proof II* came up with by far the most synonyms.

Word Proof II comes complete with a spelling checker, an anagram finder, a nearly complete text editor/word processor, and more. And you get all that at a lower price than you'd pay for the other two packages.

But each program has its quirks and deficiencies in handling certain kinds of words. The only program to come up with a noun synonym for *ship* was *The Reference Set*, which gave *boat*, *craft*, and *vessel*. *Word Proof II* was the only program that could handle -tion nouns like *interpretation*, *communication*, and *imagination*. The others suggested *interpret*, *communicate*, and *imagine*. None of the programs, however, can either search on or provide phrases instead of single words, and none recognized *soliloquy*, the only truly challenging word in my test batch.

All three programs are at least a partial answer to my dream of a full on-line thesaurus. But until someone writes a thesaurus program that is memory resident, can handle phrases up to several words long, and has a vocabulary that is much more extensive than my own, I'll stick with *The Book: the fourth edition of Roget's International Thesaurus*.

—Paul Stafford

XyWrite II Plus.

The fastest
word processor
available
for the IBM PC.

**SAVES TIME.
SAVES MONEY.**



Now you can save up to 45 minutes each day by using the word processor designed for office and professional users.

Consider this: XyWrite II Plus costs about half as much as some of the most popular word processing packages—it's more than twice as fast—has over 150 features and functions, including three types of split screens with simultaneous multi-file access, column moves, boilerplate editing, see-what-you-print display, foreign languages, mail merge... And what's more, we have the best user support team available. They're standing by, ready to help.

Only \$295.

With the time you save, XyWrite II Plus will pay for itself in three months.

Mastercard and Visa accepted.

For a demo disk send \$7.00.

This will be credited if you buy XyWrite II Plus.

Requires the IBM PC, XT or compatible hardware with 192K memory.

XyQuest

P.O. Box 372, Bedford, MA 01730
(617) 275-4439

Please send me _____ copies of XyWrite II Plus
_____ copies of XyWrite II Plus demo disk

(Add 5% sales tax in Mass.)

Check enclosed _____ MC _____ VISA _____

Card No. _____

Exp. Date _____

Name _____

Title _____

Company _____

Address _____

City _____ State _____ Zip _____

Signed _____ PC1224

IT PAYS TO READ THE FINE PRINT!

INTRODUCING — EGA PAINT —

The graphics drawing program for users of the powerful Enhanced Graphic Adapter (or equivalent). Hi-Res (640 x 350) & 16 out of 64 colors is supported with the EGA's optional memory expansion.

EGA PAINT has most of the features of current Paint programs plus capabilities only the EGA board makes possible:

Brush Controller • Automatic Shapes • Fill & Pour • Move & Copy • Undo • Pop-up Grid • Zoom • Enlarge & Reduce • Text • Screen Save & Retrieve • Image Library • Screen Print & Capture • Extensive Utilities.

EGA PAINT allows you the greatest flexibility available in color mixing, brush size, positioning, and a special translation program lets you produce & edit incredibly sharp & colorful graphs from Lotus 1-2-3.

EGA PAINT gives you Text, in a wide variety of sizes & fonts, anywhere you want it. The Zoom feature can take any 24 x 24 area & magnify it by a factor of 8 for ultra-high detail. With the unique Image Library you can save any images that you use frequently & later place them anywhere on the screen.

EGA PAINT enhances the accuracy of the positioning of your pictures with the Grid function which is adjustable from 10 to 40 pixel increments. The Fill & Pour feature allows you to fill areas bounded by any color or fill a specific color boundaries. Also any area, up to 1/4 of your screen can be copied and moved to any location you wish. A special dual-image format allows you to Save & Retrieve in two modes. The Large format while extremely fast requires only 112K per image. The Compressed format while slower, results in an image one-tenth the larger size.

EGA PAINT supports most PC compatible graphics printers & color printing on the Okimate 20.

- ALL THIS FOR THE LOW
- INTRODUCTORY PRICE OF

\$ 79.00

ORDER NOW! (714) 261-0440
(Visa & MC OK)

RSI

RIX Software Inc. • Suite F
17971 Skypark Circle • Irvine, CA 92714

RSI also provides the popular TV Spool program. The first to bring mainframe print spooler features to the Top View environment. Also available is EGA 1-2-3, a set of EGA Drivers for Lotus.

CIRCLE 523 ON READER SERVICE CARD

SPELLING CHECKER ROUNDUP

teractive modules that comprise the program (about 300K bytes total). The size of all the spelling checker modules together is 123K bytes, with the main dictionary taking up most of the space. Installation is quite easy (as it was with most of the programs): you simply copy the files onto your hard disk (if you have one) or your favorite word processor's program disk (assuming there's room). You can also make a working copy of *The Word Plus* on a sep-

arate floppy disk, though that will obviously make the program more difficult to use (this procedure applies to all the programs tested).

Also packaged with *The Word Plus*'s spelling checker is a unique collection of writing-related "tools," including some helpful and fun utilities. These include *HYPHEN*, which hyphenates words for you; *LOOKUP*, which, as it sounds looks up words against the dictionary (*LOOKUP*

PC FACT FILE



The Word Plus
Oasis Systems
2765 Reynard Way
San Diego, CA 92103
(619) 279-5711
List Price: \$120

Requires: 64K RAM, one disk drive, DOS 1.1 or later.

Total Program Size: 123K bytes
Dictionary Size: 35,000 words

CIRCLE 634 ON READER SERVICE CARD



Paperback Speller
Paperback Software
International
2612 Eighth St.
Berkeley, CA 94710
(415) 644-2116
List Price: \$39.95

Requires: 128K RAM,

two disk drives, DOS 2.0 or later.

Total Program Size: 140K bytes
Dictionary Size: 60,000 words

CIRCLE 635 ON READER SERVICE CARD



V-SPeLL
CompuView Products Inc.
1955 Pauline Blvd.
Ann Arbor, MI 48103
(313) 995-1299
List Price: \$125

Requires: 64K RAM, one disk

drive, DOS 1.1 or later.

Total Program Size: 213K bytes
Dictionary Size: 60,000 words

CIRCLE 629 ON READER SERVICE CARD



The Speller
Hayden Software
600 Suffolk St.
Lowell, MA 01853
(800) 343-1218
List Price: \$39.95

Requires: 64K RAM, one disk drive, DOS 1.0, 1.1, 2.0.

Total Program Size: 108K bytes
Dictionary Size: 20,000 words

CIRCLE 627 ON READER SERVICE CARD



Spellix
Emerging Technology
Consultants Inc.
4760 Walnut St.
Boulder, CO 80301
(303) 447-9495
List Price: \$95

Requires: 128K RAM, one disk

drive, DOS 2.0 or later.

Total Program Size: 202K bytes

Dictionary Size: 66,000 words

CIRCLE 632 ON READER SERVICE CARD



**Webster's NewWorld
Spelling Checker**
Computer Software Division
Simon & Schuster Inc.
1230 Avenue of the Americas
New York, NY 10020
(212) 245-6400
List Price: \$59.95

Requires: 128K RAM, one disk

drive, DOS 1.1 or later.

Total Program Size: 207K bytes

Dictionary Size: 100,000 words

CIRCLE 631 ON READER SERVICE CARD



**The Random House
Proofreader**
Digital Marketing Corp.
2363 Boulevard Circle
Walnut Creek, CA 94595-9990
(800) 826-2222
List Price: \$49.95

Requires: 128K RAM, one disk

drive, DOS 1.1 or later.

Total Program Size: 248K bytes

Dictionary Size: 50,000 words

CIRCLE 630 ON READER SERVICE CARD



Word Proof II
IBM Entry Systems Division
5201 S. Congress Ave.
Boca Raton, FL 33431
(305) 998-2000
List Price: \$39.95

Requires: 128K RAM, one disk drive, DOS 1.1 or later.

Total Program Size: 152K bytes

Dictionary Size: 125,000 words

CIRCLE 628 ON READER SERVICE CARD

across, for example); **WORDFREQ**, which calculates the frequency of words, total words, unique words, and words appearing once; and **ANAGRAM**, an anagram finder for word-game aficionados.

To invoke the spelling checker, you type TW (The Word) and the filename you want to check. The four modular programs that comprise *The Word Plus*'s spelling checker load in about 2 seconds from a hard disk (just slightly more from a floppy



All the other programs tested perform for the most part fairly equally, but Webster's NewWorld Spelling Checker gets the nod as Editor's Choice.

The voluminous dictionary, full range of features, and excellent user interface make working with it a pleasure. It may not be champion by a knockout, but it is the heavyweight of the bunch. Honorable mention goes to the surprising Paperback Speller, an excellent value that would be more of a winner without its annoying key disk requirement.

disk), offer you some profile options like marking words that change length, and then compare your text file against the dictionary. When this process is done, a module called **REVIEW** will offer you the unmatched words one at a time in alphabetical order. You can then correct the spelling, look up the offending word in a dictionary, view it in context (with a few lines of the text), discard it (accept as is), or add it to an auxiliary dictionary. If you make a mistake, you can go back to the previous word and amend your ways. While *The Word Plus* won't insert choices from its 35,000-word dictionary (you are typically offered two or three alternatives), it will automatically insert the correct words at the end of your review session.

If your processor lets you run another program without exiting it (like *WordStar*'s option R), you can invoke *The Word Plus*. If not, you will need to exit, run *The Word Plus*, and bring up your word processor again. The program will work with most word processors that follow standard DOS file conventions. If your word processor stores files in an unconventional format (as *MultiMate* does), you'll need to convert to ASCII and then back into your

word processor's format after editing.

The Word Plus is a solid, hard-working, utilitarian package with some extras that a number of other packages still don't have. Though it's no longer state-of-the-

art, the program is well worth considering. It's easy to use, reliable, relatively quick, and the extra utilities are both fun and useful. It's nice to know that a program written years ago still holds up so well today.

Swap diskettes with popular CP/M* computers!

Just \$69.95 turns one of your PC's floppy drives into a CP/M computer "look-alike" with UniForm-PC.

Imagine a software breakthrough that gives your IBM PC, PC-XT, PC-AT or compatible the ability to directly read, write and format diskettes from most popular CP/M computers—8 or 16 bit! Remarkable UniForm-PC actually reconfigures your floppy drive to emulate the selected CP/M format, allowing your applications programs and utilities to directly access data files that were previously out of reach.

Menu-driven UniForm-PC is easy-to-use and inexpensive. Simply load, select the proper diskette format and go! DOS procedures are unchanged when you use the CP/M diskette. You can even start a project on a PC at work and finish it on a CP/M machine at home without the need for additional hardware or modifications! At just \$69.95, CP/M compatibility never cost so little!

UniForm-PC is available now from your local computer dealer or Micro Solutions.



For CP/M computer owners, UniForm bridges the gap between non-compatible CP/M formats, as well as providing access to MS-DOS™ files. It's also just \$69.95.

Trademark
Digital Research
Microsoft Corporation

MicroSolutions

125 South Fourth St.
DeKalb, IL 60115
815/756-3411



CIRCLE 366 ON READER SERVICE CARD

SPELLING CHECKER ROUNDUP

The Speller

The *Speller* from Hayden Software is a bare-bones product. It will run in only 64K bytes of RAM, and the main dictionary is only 20,000 words. While 20,000 words

may sound like a lot to you and may, in fact, account for "97 percent of total usage," the odds are good that this program will fail to recognize more words that are correctly spelled than will programs with

larger dictionaries. This was, in fact, the case: *The Speller* turned up 125 unrecognized words in the sample file, twice as many as any other program.

To its credit, *The Speller* is very easy to use, as can be seen by the brevity of the documentation. You invoke the program by typing `SPELLER <filename>` and waiting a bit. It took a long 73 seconds for *The Speller* to read our sample file and check it against its dictionary. You then encounter a menu that allows you to display a list of suspect or valid words, print a list of suspect or valid words, check suspect words one by one, scan the text (stopping at all suspect words), use an additional dictionary, review previous word choices (giving you a chance to change your mind), or exit.

The Speller doesn't allow you to look up correct spellings against the dictionary, which is a mixed blessing. A good spelling checker should function as an on-line dictionary during its interactive correction mode. *The Speller*, however, missed so many correctly spelled words that you could spend all day checking the dictionary to verify spellings.

The Speller missed such common words as *ado*, *deity*, *typos*, *conundrum*, *mercifully*, *sensual*, *esoteric*, *distract*, *ponder*, and *cleansed*. The first two words probably won't show up in many business letters, but there's no excuse for the others not to be included. The program also doesn't catch double occurrences of words or offer additional utilities.

If you want to use this product, you'd be well advised to bolster the meager main dictionary by running a number of your existing documents through the program to create some auxiliary dictionaries containing other words you commonly use.

The Speller is not at all suitable for business use, and even for home use you should weigh its \$39.95 price against the limitation of its small dictionary and lack of features. If other programs were complicated, *The Speller's* simplicity might stand out, but most of the others were straightforward and relatively complete; so *The Speller* pales by comparison.

Spellix

Spellix is part of the reasonably priced series of "ix" programs from Emerging

POWER BOOSTERS



Pascal-Plus (For IBM-Microsoft Pascal)

Turbo-Plus (For Turbo-Pascal)

Compile 50 times faster.

Plus Software is a library of procedures crafted in assembly language and designed to enhance Turbo-Pascal™ and IBM-Microsoft Pascal. No royalties are required for applications developed using Plus Software. These procedures are extremely fast and combine automatically with your programs. The benefit to you is faster development and compilation time and smaller, faster application programs. Features include:

- Multiple input/output field display map generation with edit masks
- Instant text write
- Instant attribute write (the fancy cursor maker)
- Display chunk retrieval
- Graphics text write (any size or position)
- Pop-up any time reference guide and printed manual
- Snow removal
- Ram/Window
- Advanced keyboard control
- Multiple screen snapshots and restores
- File handle I/O
- Sample programs with source code

\$59.95 (Requires IBM PC and compatibles)



Turbo-Spawn

(For Turbo-Pascal)

\$39.95

(Requires MS-PC-DOS)

Turbo-Spawn lets you execute any size program including another Turbo Pascal program or Dos commands without leaving current program and continue with next instruction. **Breaks the 64K barrier.**



Screen Genie

The ultimate screen editor at any price.

- Creates and edits screens for programmers and non-programmers
- Full typematic and cursor control. Insert, overwrite in two dimensions
- Paints/unpaints, draws/undraws in any direction. Easy to use selection menus
- Copy/move lines or window pieces with forgiving adjustment feature
- CREATES FIELDS AND GENERATES CODE FOR USE WITH PLUS SOFTWARE
- Creates screens as executable files for non-programmers
- Creates load files (for any language), .obj files, .com external procedures

\$69.95 (Requires IBM PC and compatibles)

Nostradamus Inc. Software source

Please send me:

- ☐ Turbo-Plus **\$59.95**
- ☐ Pascal-Plus **\$59.95**
- ☐ Screen Genie **\$69.95**
- ☐ Turbo-Spawn **\$39.95**

Total amount \$ _____

☐ Check ☐ Money Order Name _____

☐ Visa/MasterCard/Amex _____

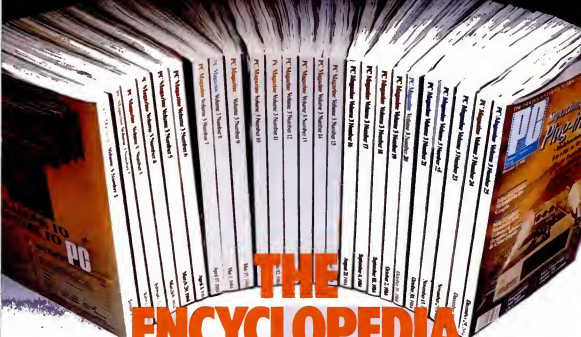
No. _____ Address _____

Exp. Date _____ City/State/Zip _____

U.S. shipping and handling included
Outside U.S. add \$10.00 per item

**Nostradamus Inc. / 5320 South 900 East, Suite 110
SLC, Utah 84117 / Order by phone (801) 261-0769**





THE ENCYCLOPEDIA OF INFORMATION FOR YOUR IBM PC

Taken one issue at a time, *PC* is the best source of up-to-date news and information about the IBM PC you can find anywhere.

But collect a few, and suddenly you realize that you've assembled a comprehensive reference work covering every significant new IBM PC application, product and development. *An encyclopedia you receive 22 times a year!*

Each volume of *PC* contributes the latest information on a wide variety of subjects including:

- **New Products** What's the latest in printers, word processing software and database managers? And what's best for your needs? Everything you need to know is in *PC*'s special reports and product reviews.

- **New Applications** Need to design a graphics presentation? Communicate with other PCs? Access a database? Find out how in *PC*'s expertly written articles.

- **New Developments** How are successful professionals and companies using their PCs? Find out in *PC*'s "Pro Columns" and use their proven techniques to move ahead in your own career.

Subscribe to *PC* today. Build your own IBM PC reference library by volume and save 66% off the single copy price!

One year (22 issues) only \$22!

To order, complete attached
order card or call, toll-free,
1-800-852-5200



SPELLING CHECKER ROUNDUP

Technology Consultants Inc., which includes *Edix*, *Wordix*, and *Offix*. The documentation bills the program as "The World's Finest Spelling Checker," and the program wasn't bad at all. I might have

been a little more inclined toward it were the price more modest.

Spellix features a healthy 66,000-word dictionary, which takes up 122K bytes of disk space. The program itself adds about

80K bytes to the total space requirement. And it has a glitzy and modern front end, with nice use of color (which can be changed) and some frills like the ability to toggle the speed at which it scrolls through the program during proofreading.

Also, it's fast—sort of. It booted and read the sample file in 8 seconds from my XT's hard disk, making it the Carl Lewis of spelling checkers. Of course, like the other programs, you still have to correct the words as you come to them during a scan or search session, but at least *Spellix* puts you a minute or so ahead of the game.

Despite the good-sized dictionary, *Spellix* missed a few words, notably *neopism*, and it won't automatically insert alternate choices into your text. *Spellix* scrolls through your edit session, stopping when it comes to an unknown word, which it highlights with inverse video.

The dictionary lookup feature also makes some interesting assumptions about the ways words are misspelled. For *Spellix* to come up with alternative spellings for an unrecognized word, the first letter of the word must be correct. Mistakes it recognizes are an extra letter, a missing letter, a wrong letter, or two transposed letters in a word. *Spellix* caught errors like *impossibl* from the sample file but could not offer alternative spellings from its dictionary. It also couldn't find words like *yorseloff* in its dictionary. When it does have an idea of the correct alternative, it offers up to eight options (if it can find that many).

The product is menu driven (your options are displayed in the lower-right quadrant of the screen and invoked by hitting a single menu key, like F for Find the correct spelling in the dictionary). The logic used to create the dictionary searches also means it had only one alternative for *presint* (pressing), offered none for *hundrid*, and listed *uncontaminated* and *unharmed* as errors. Oddly, though, it was one of the few programs that could offer the correct spelling for *emnnity*: *emnnity*.

Despite its speed and ease of use, *Spellix* comes up short in comparison to the best but might be worth a look if you're willing to beef up its dictionary on your own.

Paperback Speller

Part of the paperback series from Adam Osborne, *Paperback Speller* has a number

Lattice® Products Are Your Best Investment

Lattice Screen Editor \$125.00
(LSE)—Designed as a programmer's editor, LSE is fast, flexible and easy to learn. LSE's multi-window environment provides all the editor functions you need including block moves, pattern searches, and "cut and paste." LSE also offers special features for programmers such as its error tracking mode and three assembly language input modes. You can create macros or customize keystrokes, menu, and prompts to your style and preferences.

Lattice TopView Toolbasket \$250.00
—Provides more than seventy C functions for creating programs to take advantage of the IBM TopView environment. Speed TopView-specific program development with window, cursor, pointer, and printer control functions. Expedite program development with the debugging utilities included.

LMK™—Automated product generation utility \$195.00
for MS-DOS, similar to UNIX "Make."

C-Sprite™—Symbolic debugger for programs written in Lattice C or assembly language. \$175.00

C Compilers—MS-DOS \$500.00
and PC-DOS—The industry standard.

Pamel™—High performance screen design and screen management system. Available for MS-DOS, PC-DOS, and UNIX systems. \$295.00

DBC II™ or DBC III™—C function libraries supporting indexed files that are compatible with dBASE II® or dBASE III™. \$250.00

C-Food Smorgasbord™ \$150.00
includes a BDC decimal arithmetic package, I/O functions, IBM-PC BIOS interface, terminal independence package, plus many other utility functions.

With Lattice products you get *Lattice Service* including telephone support, free updates during the warranty period, notice of new products and enhancements when you register, and a money-back guarantee.

Call us today for further information on these, or our many other C programs, utilities, and tools! Corporate site license agreements are also available.



Lattice, Inc.
P.O. Box 3072
Glen Ellyn, IL 60138
Phone (312) 858-7950
TWX 910-291-2190

International Sales Offices

Benelux: De Voight. Phone (32) 2-720-91.28.
England: Roundhill. Phone (0672) 54675
Japan: Lifeboat Inc. Phone: (03) 293-4711

of interesting and worthwhile features. First, the packaging looks like, well, a paperback book. Actually, it is a paperback book (with a disk in back). The cover features an illustration of Sherlock Holmes and Dr. Watson examining "suspect" words on a PC screen (it definitely wins the cute packaging award).

The documentation is clear-cut and concise, as is the installation. To install *Paperback Speller* on a hard disk system, you put the program disk in drive A: and type A:XTSETUP. That's it. The product is, alas, copy protected, and so you must have the original program disk in drive A: even if you're running from a hard disk, an unfortunate and annoying requirement.

You invoke the program by typing SPELL (or WSPELL if you're checking a *WordStar* file), and the program loads virtually instantaneously. The main menu offers three choices: Check, Directory, or Quit. You can bring the program into

check mode directly by typing SPELL <filename> if you wish. Typing CHECK and the filename from the main menu loaded the dictionary and sample file in 8 seconds and gets you ready to go. This time was as fast as any of the programs tested. When beginning the check, the program instantly showed one of its more endearing strengths, flagging double-word occurrences, something most of even the more expensive programs didn't do.

The 60,000-word main dictionary also includes some rare and convenient items like foreign words, major cities, noun plurals, and possessives. When *Paperback Speller* encounters a word it doesn't know, it stops, highlights it, and automatically displays its best guesses at the top of the screen, numbered 1 to whatever (usually 2 to 4). You can then accept the word as is, insert it into a working dictionary or insert a correct alternative by typing the number in front of that choice, or replace it with a

spelling you type in yourself. The program also features an UNDO command to undo your last correction—a nice touch.

Paperback Speller is compatible with Osborne's *Paperback Writer* and *Executive Writer*, *WordStar*, *PC Writer*, *New-Word*, *Volkswriter Deluxe*, and plain old ASCII files. If your computer's memory is limited, the program will run a little slower, making two passes at the document, one for letters a-j and one for j-z. The .COM file takes up about 30K, and the four lexicons take about 35K each.

As did all the programs, *Paperback Speller* showed some interesting quirks in handling our sample file. For example, it accepted *foster-child's* correctly and offered *present* as the correct spelling of *pressint* but couldn't find a match for *imeditaly* (it offered *impeding*, *impeded*, *impedes*, and *impede*). It did get *ennmy* as the correct spelling for *ennmy*, and was the only program to even dare offer an alterna-

IN A PINCH? ... GIVE QIC THE INCH!

20 MB Hard Disk
\$499



QIC-01 10, 20, 33 MB Hard Disk System

Our low power half-height disk system comes with controller, cables and drive for IBM PC, XT. Boots directly from hard disk using DOS 2.0 or later. Internal 10 MB \$475, 20 MB \$499, 33 MB \$1095. External 20 MB \$699, 33 MB \$1245. High speed full height drive for AT - 20 MB (40 ms) \$745, 30 MB (40 ms) \$995.

Expansion Chassis with 7 1/2 slots, 135 Watt power supply \$625.

QIC-AT286 CPU Board, 30% faster than IBM, with 640K RAM \$1250.

QIC-5151 Keyboard \$119

QIC-03 300/1200 Baud Modem

Our half-size modem fits inside short slots of your XT. Fully Hayes-compatible - runs all popular software. Auto-dial, auto-answer, "modem-on-a-chip", low heat dissipation, software volume control. Supports COM3 and COM4. Includes software to emulate VT100 and IBM 3101.

Full size internal \$199.

Half size internal \$215.

External \$215.

All the Trump Cards

Multifunction card for PC, XT - 8K memory (up to 384K), 1 serial, 1 parallel, 1 game port, one clock/calendar \$129.

With 2 serial ports \$179.

Multifunction card for AT - 128K (up to 3 MB), 1 serial (2nd optional), 1 parallel, 1 game port \$299.

Half-size card for PC or AT - memory card 8K (up to 384K) \$75.

10 Card with 1 serial (2nd optional), 1 parallel port, 1 clock/calendar \$99.

Graphics Cards - IBM-compatible color card \$125. Hercules-compatible mono \$175. Everex, the Edge \$275.

To Order Call

800-843-0806

Tel.: 5101002379 QICRCH

No Risk - 30 Day
Money-Back Guarantee



QIC RESEARCH

INCORPORATED

489 Valley Way
Milpitas, CA 95035
408/942-8006

QIC-701

CIRCLE 127 ON READER SERVICE CARD

SPELLING CHECKER ROUNDUP

tive spelling for *Kafka*, suggesting *Karma*, *Kappa*, *Kale*, *Kales*, and *Kant*. I don't know whether *Kafka* would be pleased or insulted, but it was certainly a nice try.

At \$39.95 *Paperback Speller* is a great

buy, very quick, easy to use, and more than adequate for most proofreading. The only major drawback was the key disk requirement. Otherwise, it's an excellent program at a very good price.

The Random House Proofreader

Based on *The Random House Dictionary*, *The Random House Proofreader* packs a 50,000-word dictionary into its 248K of disk space. It performs most necessary tasks reasonably well.

Loading and checking the sample file took 90 seconds, which is pretty good considering the size of the dictionary. Like most programs, *The Random House Proofreader* compares files against its dictionary before it gives you a chance to correct any errors; so the larger the dictionary, the longer the check.

The Random House Proofreader was a bit cumbersome to use. After you tell it which file you want to check, it reads in the file, displays a screen telling you how many words it read, and sorts it for unique words. Then it checks the main dictionary (and the auxiliary dictionary if you have one) and displays the number of unknown words. The command menu then offers you the option to correct (in context), review (no context displayed), mark for later action, display unknown words, or mark words that change length (a real convenience for programs that require manual reformatting after word-length changes).

The program displays two lines of your document for context, with unknown words highlighted. Correction is interactive but not automatic. Even if the program displays a correct selection from the dictionary, you must type it in manually. And using the dictionary was a little slow. If you want dictionary help, you press D and the word in question is highlighted again at the bottom of the screen with the message, "Press Enter to search for _____, or enter a new word." Hitting Enter will engage a dictionary search and then display several alternatives, as many as 20. If one looks good, you then must type it in as correct.

Performance with the sample file was so-so. *The Random House Proofreader* couldn't display a correct selection for *pressint* or identify *changeableness* as correct. Plus the screen display was rather dull, and if you're going to spend a lot of time waiting around (which you will with many of these programs), you might as well have a pleasant display to look at. You must accept this one as is, since there are no profile settings to change colors or any other screen attributes.



ICON
QUEST FOR THE RING

A World of Adventure Awaits You!

Enter into a truly epic legend, Wagner's "The Ring of the Niebelungs." You witness the theft of the Rheingold and embark on your quest for justice in *ICON: Quest For The Ring*.

Leave the world of ordinary 4 color graphics behind. *ICON'S* unique 16 color, 320 x 200 graphics works with the standard IBM color card or compatible cards. Animation at 6 frames a second gives you arcade style play with either keyboard or joystick control.

Items on the IBM PC, XT, AT & Jr, the Tandy 1000, 1200, Compaq or any true IBM compatible, 128K & color card required.

CALL (800) 622-8086
MOVISA, COD or dealer inquiries

Mail to:
MACROCOM, INC. 1790 Little Willow
Marietta, GA 30067

\$49.95/Copy _____
GA. residents add 4% sales tax _____
Total _____
Make checks payable to: Macrocom, Inc. _____

IBM is a trademark of International Business Machines. Tandy is a trademark of the Tandy Corp. Copying is a trademark of the Compaq Computer Corp.

CIRCLE 470 ON READER SERVICE CARD

**The Service
Computer Company**

**WE
WELCOME
CORPORATE
ACCOUNTS**

The Service
Computer Company

RAPIDWARE

OVER 1000 ADDITIONAL ITEMS

Start \$12*

RAPID WATER
CALL FOR OVER 1000 ADDITIONAL ITEMS
\$12**
We'll Beat Any Price

FREE
OVERNIGHT
DELIVERY*

**We'll Beat
Any Price
By**

\$12⁺

Software

	LIST PRICE	OUR PRICE
ASHTON TATE, dBASE III	595	374
BOYLAND INTERNATIONAL Sidekick (Protected)	55	35
Sidekick (Non-protected)	85	55
BRODERBUND SOFTWARE Bank Street Writer	80	55
BPI SYSTEM Job Cost Accounting	795	595
Inventory	795	595
General Accounting	595	595
AR, AP, or P/R	80	595
Funk Software, Sidekicks		595
Fox & Geller Quickcode II	295	295
Quickcode III	295	295
dGraph II	295	295
dGraph III	59	495
dData II	395	395
Harvard, Tot. Proj. Mgr. GL, AR, AP,	595	595
OE, or Inventory		595
LIFETIME, Volunteer deluxe		595
LIVINGLOID, Think Tank LIVINGLOID V2-3		595
LOTUS Lotus Jazz		595
MECA, Managing Your Money		595
MICROPRO, Wordstar 2000		595
Wordstar 2000+		595
MICROMIN (dBASE 5000 MICROSOFT, Word		595
Multiple		595

	LIST PRICE	OUR PRICE
MICROSTUFF, Cronstack	185	104
MONOGRAM	180	11
Dollar & Sense	495	24
MULTIMATE	CALL	
PEACHTREE SOFTWARE		
PETER NORTON,	100	
Utilities		
SOFTWARE ARTS,	400	
TK Solver		
SOFTWARE GROUP,	595	
Enable		
SOFTWARE PUBLISHING	125	
PFS: Report	140	
PFS: Plus, PFS: Plus	140	
PFS: Graph, PFS: Vista	95	
PFS: Prool		

	LIST PRICE	OUR PRICE
HERCULES, Color	245	189
HERCULES, Graphics	499	309
QUADRAM	595	359
Quadboard (256K)	229	174
PARADISE, 5 pack		
TECHAR	289	209
Captain Multitouch (640K)		
COMPUTERS	CALL	CALL
IBM, APPLE,		
Compaq, others		
HARD DISKS	1400	944
MAYNARD,		
20 mb int. w/Cont		
IOMEGA, TALLORASS,	CALL	CALL
CONVUS, others		
MODEMS	489	369
Haystack 1200B		
Vox 1200B	549	399

Hardware

AC PRODUCTS	55	41	AMDEP	Color 300	CALL	218
Mech/Wire/Fibre Buton				Princeton Graphics		308
KONA	150	104	PRINTER	Texas, Quadram, etc.	399	629
Touch Tablet			PARADIGM, P1090		1900	1378
w/Software	150	39	TOSHIBA			CALL
KENSINGTON,			P1340 (4-Mcpl)			
Masterpiece	50	39	P351 (8Mcpl)			
PC Saver Line Cord			EPSON, OKADA			
w/Fitter	220	148	NEC, many others			
MOUSE SYSTEMS,						
PC Mouse & Pad						
MEMORY CHIPS, CABLES,						
POWER BACKUPS,						
CLEANING KITS,						
COVERS, PROTECTORS,						
FLOPPIES, etc.	CALL	CALL				
BOARDS						
AST, Mega Pak (250K)	485	359				
Advantage (120K)	595	419				

**CALL FOR
WEEKLY SPECIALS!**

AD#
F12

**CALL FOR
WEEKLY SPECIALS!**

AD#
F12

**FREE NATIONAL SALES
HOT LINE** Prod

SALES 1-800-642-7675

Products listed for IBM PC ONLY. Call for APPLE and other m

TERMS: • Products have full manufacturers warranty • No surchar

• Authorized purchase orders and CO's accepted • Pri

• For products over \$100 only. Call for details.

MAIL TO: M

1-800-642-7673

Products listed for IBM PC ONLY. Call for APPLE and other micro systems.

TERMS: * Products have full manufacturers warranty. * No surcharge for credit cards.
* Authorized purchase orders and COD's accepted. * Prices may change.

MAIL TO: RAMPWARE
6900 E. Indian School
Scottsdale, AZ 85255
(714) 540-1502

MAIL TO: RAIDWARE
6900 E. Indian School
Scottsdale, AZ 85251
(714) 540-1502

SPELLING CHECKER ROUNDUP

The *Random House Proofreader* is solid but lacks many of the features and the conveniences standard with other programs. If you're searching for the perfect spelling checker, search on.

Word Proof II

Word Proof II is part of IBM's Personally Developed Software series. The people who personally developed *Word Proof II* packed a lot of features into the program-

ming, including auxiliary programs for synonyms (see the accompanying sidebar, "Stalking the Elusive Synonym") and anagrams as well as an on-line tutorial. What they didn't include was printed documentation; they leave that up to you and your printer.

You're instructed to insert disk A into your drive (a second disk has the synonym list) and type A:G. This brings up the tutorial and the option to list the documentation out to your printer, which is a very good idea if you want to know what's happening. (Maybe I'm old-fashioned, but I enjoy at least having the option of reading the documentation without having to print it out myself.) You have to wait for your printer to spit out about 50 pages before you can learn everything worth knowing about *Word Proof II*.

Once that's done, *Word Proof II* has a lot going for it: a very nice front end, with excellent color support and nice screen designs, support for all types of displays, and the ability to change colors and prompts easily. In fact, it probably scores better here than any of the other programs tested. And it's the most feature-laden package available. There are too many bells and whistles even just to list here, but they include a built-in text editor, synonym finder, and anagram finder. All of these options take up about 300K bytes of disk space, plus another 160K bytes for the synonym dictionary.

Word Proof II is fast; it took only 4 seconds to load in the sample file. But it doesn't compare your words against the dictionary's until you ask it to. Hitting the F2 function key will start the program proofreading from the cursor location onward, stopping at each word that it doesn't recognize. *Word Proof II*'s context display is very good, and it scrolls through your document quickly.

The program offers extensive on-line help, which you might need to take advantage of if you want to access the more advanced features. *Word Proof II* has so many functions (spell check starting at cursor, spell check a single word, display search and replace choices, insert a blank line, and so forth) that you might find it a bit confusing. Although some of the options are useful, most users will never care to learn about many of them.



FOX & GELLER

dBASE-III POWER TOOLS

QUICKREPORT™ dBASE Report Writer

A full featured report writer for any job—simple or complex:

- Connect up to 6 databases per report
- No programming required
- Draw reports on screen
- 16 levels of sorting
- 16 levels of totalling
- Use bold, underlining
- Print forms
- Date, arithmetic
- Up to 255 columns wide

POWERFUL,
YET
SIMPLE

Now you can
create database
applications in
minutes without
programming.

- Generate dBASE programs automatically
- Programs are commented and bug-free
- Data Entry Programs/Forms
- Data validation programs
- Computed fields
- Multi-page forms
- Menu Generator

QUICKCODE-III dBASE-III Program Generator

Also Available:

dGRAPH-III—Quality graphics for dBASE-III

dUTIL-III—Programming utility for dBASE-III

NEW QUICKINDEX—Index Files up to 90% faster than dBASE

Available from your local dealer.

(201) 794-8883

FOX & GELLER
604 MARKET ST.
ELMWOOD PARK,
NEW JERSEY 07407



dBASE™ Ashton-Tate Quickreport and QuickCode™ of Fox & Geller

CIRCLE 267 ON READER SERVICE CARD

Although the program does move quickly through the document, you must stop at each word and invoke the dictionary look-up (some programs offers alternative spellings automatically). The choices come up quickly, appearing on the screen as a window in your document.

Word Proof II picked out *AL1* as a typo but missed the phonetic spelling of *pressing*. With a program like *Word Proof II*, it's better if you know the correct spelling. It will find all your typos, but you might need to refer to your own dictionary to find the correct answer. *Word Proof II* will replace incorrect spellings with correct ones automatically; you simply move to the right choice with the cursor and hit Return.

Word Proof II is a worthwhile program—if you can put up with its complexity and minor drawbacks, such as the lack of printed documentation. Fast, attractive, and loaded with features, it's definitely worth a look.

Webster's New World Spelling Checker

Webster's New World Spelling Checker comes enclosed in a garish yellow and red hardbound book that looks like, you guessed it, *Webster's New World Dictionary*. Despite the jarring color scheme of its packaging, it is a simple, elegant, yet powerful program.

This spelling checker is based on the excellent *New World Dictionary* and the *New World Misspeller's Dictionary* (15,000 commonly misspelled words). As befits its academic origins, the program is ready for some serious proofreading. In fact, in terms of sheer size, *Webster's* is the knockdown, drag-out, clear-cut winner; it shoehorns a whopping 100,000 words into 207K of total disk space.

Installation is quite simple. As with most spelling checker programs, you merely type a couple of letters (in this case WSP) to get things rolling. *Webster's* took 65 seconds to load, read, and sort the sample file to the point that I was ready to edit, which is quite good considering the massive dictionary size.

The program has plenty of bells and whistles, though they aren't of the word count or anagram type. They're a little on the more serious side: options for the type of word processor you're using, the name of the auxiliary dictionary, whether to

Forecasting and Statistical Analysis

StatPac™ the proven statistical analysis package

The standard for business and industry for over six years. Comprehensive and easy to use. StatPac is a full-featured statistical package for professional researchers.

Forecast Plus™ a time-series analysis forecasting tool

A combination of data management, exploratory graphics, and over a dozen forecasting techniques, make Forecast Plus the most powerful time-series package available. It works fast, accurately and automatically.

Goodness-of-Fit™ a regression package for model building

A full-featured regression package for professional researchers. Command driven with versatile programming language.

Call for complete information: 1-800-328-4907

WALONICK ASSOCIATES

6500 Nicollet Ave. S., Minneapolis, MN 55423

(612) 866-9022

In Europe: Molmex Ltd., 1 Buckhurst Rd., Town Hall Square,
Bexhill-on-Sea, E. Sussex, England Tel. (0424) 220391



CIRCLE 360 ON READER SERVICE CARD

COPY II PC OPTION BOARD

At last, an almost foolproof method of making archival backups of protected software! The Copy II PC Option Board is an add-in board that will give your PC the same disk duplication technology used by most disk duplication firms (who put the copy protection on software in the first place!).

DUPLICATES NEARLY ALL* PROTECTED DISKETTES!

The Option Board can easily backup almost all protected diskettes for the IBM PC, including ones software-only backup programs can't touch! It even includes a track editor that will allow the more technically inclined to look at protection schemes and edit any data on a diskette.

The Option Board uses a full size slot in an IBM PC, XT, or AT (with at least 1 360KB floppy disk drive), Compaq Deskpro, Compaq Portable requires an extra \$15 cable.

**CENTRAL POINT
Software, Inc.**
9700 SW Capitol Hwy., #100
Portland, OR 97219

503/244-5782

M-F, 8-5:30, W. Coast Time

  CHECK, C.O.D. WELCOME
(Prepayment Required)

\$95.00

plus \$3 s/h (\$12 outside U.S.)

*Except those "protected" by physical disk damage.

Now Available! Put all the most popular **disk utilities (even undelete!)** together with a powerful DOS interface. Then make them **resident** and what do you have? **PC TOOLS!** PC Tools lets you run nearly any DOS command *within any other running program.*
JUST \$39.95 plus s/h.

CIRCLE 155 ON READER SERVICE CARD

SPELLING CHECKER ROUNDUP

check repeated words, and sensitivity levels (that's how deep a scan is, not how emotional your spelling checker is). *Webster's* is configured to read files from *XyWrite II Plus*, *Perfect Writer*, *PFS:*

WRITE, *Bank Street Writer*, *Textura*, and many others, giving it the most complete list among all the programs tested.

Suspect words are highlighted (yellow on a color display), and the full range of

options is available (correct, replace globally, look up, erase word, and so forth). You may preview suspect words before you edit the document, telling the program not to stop at certain words in the text. *Webster's* offers possible correct spellings automatically (if you wish), and it will insert any offered alternative automatically for you. A "whoops!" key restores or undoes a choice while you are still on a particular word, but you can't go back once you move to the next word.

The display screen is clear and attractive, with good color support and a well-designed interface that displays enough information so that you shouldn't ever have to refer to (or perhaps even read) the concise and well-written documentation.

Webster's performed very well on the sample file and offers the nice extra touch of allowing you to page through the dictionary by using the PgUp and PgDn keys (though it's obviously easier to use a printed *Webster's* rather than this on-line one if you need to cover a lot of territory).

Webster's NewWorld Spelling Checker is a top-notch, full-featured product that doesn't weigh you down with a lot of useless extras. I recommend it highly.

V-SPELL

V-SPELL is a well-thought-out program from CompuView Products Inc. It is menu driven and easy to use and includes a 60,000-word dictionary packed into 213K.

V-SPELL uses a two-step correction process (like most of the programs). First it reads the file against its dictionary; then it displays the file, ten lines at a time, and helps you correct it. A row of options is always displayed at the bottom of the screen; the main menu (editing) choices are Correct, Lookup, Add (to auxiliary dictionary), Ignore, Make, Return (to main menu), and Help.

It's hard to find fault with *V-SPELL*. The program compiled and checked the sample file in 37 seconds, which compares well to the other programs. The dictionary is thorough, and you can add supplementary dictionaries easily. Word placement is automatic, and the documentation is brief and clear. Plus it has a very handy profile-settings feature that allows you to adjust everything from the number of context

UPGRADE YOUR DOT MATRIX PRINTER TO Letter Quality* AND GET A 128K BUFFER & MULTIPLE TYPESTYLES FREE



STYLEWriter

StyleWriter is three products for the price of one. Basically, it's an inexpensive way to upgrade your dot matrix printer to letter quality. It works easily with any computer, any printer ** and any software program. StyleWriter also has our 8K buffer that can be expanded to a spacious 128K. Finally, with dozens of typestyle options and highlighting, reverse printing and underlining features, StyleWriter allows you to create attractive and attention-getting letters and reports.

StyleWriter prices start at \$169.00 with an 8K buffer and three typestyles. Call (800) 222-9073 or (704) 525-4423 for the StyleWriter dealer nearest you.



Carolina Engineering Laboratories

818 Tyvola Road • 109 • Charlotte, NC 28210 • 704/525-4423 • 800/222-9073

Come see us at Comdex Las Vegas

Booth M212 at the MGM Grand.

*Unretouched enlargement of StyleWriter print. **Any all points addressable dot matrix printer.

CIRCLE 348 ON READER SERVICE CARD

lines displayed to the number of suggested spellings offered.

Performance on the sample file was very good, ranking with the best of the programs tested. This makes sense, since in virtually every area *V-SPELL* was one of the better choices. The toughest thing is to write about it: performance was so smooth, easy, and in a sense unremarkable that it's hard to find something to say. The program had few drawbacks. It's a good choice that won't disappoint anyone—from professional author to occasional letter writer.

Conclusion

What's the bottom line on spelling checkers? Understand their limitations. Since you can make judgment calls, as no spelling checker can, you'll still need to proof your documents. While some read files faster than others do, they all take more or less the same amount of time to correct a file, because that's work you have to do. Even if the program reads the file in 10 seconds, you have to scroll through, look at every word, decide what to do, and so on. Checking a file the size of our 20K sample file (about 7 to 8 pages of text) could easily take you up to 30 minutes from start to finish. That's not a knock against the programs, it's simply the way of the world. And while some have good-sized dictionaries, you'll still want to keep your own copy of *Webster's* handy.

Still, the better programs—*Webster's*, *Paperback Speller*, *Word Proof II*, and *V-SPELL*—will help you catch and correct errors in long files with a minimum of frustration and a higher degree of accuracy than you could get on your own. They might also catch an error in a business letter that you missed, but you won't save much time there; the longer the file, the bigger your time and energy saving. The only really disappointing program was *The Speller*. Any of the other programs paired with your word processor should improve the final appearance and impression that your work creates by eliminating spelling mistakes. Of course, the content is still up to you. ■

Jon Pepper is a technical writer who also runs a letterpress print shop in Brattleboro, Vermont.

You erased your PC's data. Get it back with The Norton Utilities.™



Peter Norton has been rescuing PC data since he first wrote *The Norton Utilities* in 1982.

It happens. Maybe you're working too late. Maybe your PC's keyboard is looking like unfamiliar territory. Press delete when you don't mean to and a whole week's worth of input data is history.

The Norton Utilities are powerful organizational tools designed for the IBM PC and DOS compatibles. With a remarkable file recovery feature called *UnErase*,™ you can actually search for and restore lost data with a few simple commands.

The Norton Utilities are great for daily disk management tasks, too. You can locate files, track down data, and put disks in order.

You're organized! And with *UnErase*, you're insured against costly mistakes.

**TIME-LIFE
ACCESS
NEWSLETTER
says "Highly
recommended for
business users."**

**THE NORTON
UTILITIES**
DATA RECOVERY
DISK MANAGEMENT

Available at Computerland and other dealers. Order direct for \$99.95 from Peter Norton, 2210 Wilshire Blvd., Santa Monica, CA 90403. 213-399-3948. Visa and Mastercard welcome.

A life saver for your data.

CIRCLE 491 ON READER SERVICE CARD

COPY II PC™

• BACKS UP PROTECTED SOFTWARE

The backup insurance you need to protect your software investment, **COPY II PC** makes a floppy backup of most* protected software quickly and easily.

• RUNS PROTECTED SOFTWARE FROM YOUR HARD DISK

COPY II PC makes using your hard disk as convenient as it should be. No longer will you have to keep your floppy disk in drive A with some of the most popular business software - call for current list.

Minimum Requirements: IBM PC, XT, AT, 256K Jr and some compatibles. One or two disk drives. 64K on most machines.

Call M-F 8-5:30 (W. Coast time) with your **MC** or **V**: **503/244-5782**. Or send a check (add \$3 s/h, \$8 overseas) to



\$39.95

**CENTRAL POINT
Software, Inc.**
9700 SW Capital Hwy. #100
Portland, OR 97219

*We update *Copy II PC* regularly to handle new protections; you as a registered owner may update at any time for 1/2 price! (No update: just send original disk and \$20.)

This product is provided for the purpose of enabling you to make archival copies only.

CIRCLE 152 ON READER SERVICE CARD

See GMS...

And you hit the jackpot at Vegas!

Gulfstream Micro Systems is the only company to offer a low-cost, high quality, full spectrum, private label product line. We have IBM® compatible micro-computers, add-on boards, monitors and peripherals.

Sound like a mouthful? Wait until you see our booth!



Booth #H7662 at the Las Vegas Hilton

5500 N. Federal Highway

Boca Raton, FL 33431

Phone 1-800-443-0500

Telex: 910 380 0112



CIRCLE 320 ON READER SERVICE CARD

The Heavens At Your Command

Spot Halley's Comet Now—With PC Planetarium

PC Planetarium.

One brilliantly conceived, meticulously executed, wonderfully easy to use software package for both serious astronomers and would-be watchers. With PC Planetarium in your IBM PC, PCjr., or PC-compatible you can: • Call up a stellar chart that tracks Halley's Comet, planets out to Saturn, the sun, moon and hundreds of stars. • Highlight any constellation. • Identify, calculate the coordinates of, and set your telescope for any object. Included in the calculations are precession, proper motion, nutation and aberration. • Print high-resolution sky maps. • Summon the heavens. From any point on earth. For any moment in the past, present or future. All, with the greatest ease and accuracy.

About the Creator: *Marilyn Davis (Ph.D., UCSD, Radio Astronomy)* is also the author of the widely acclaimed *BASIC Primer*, published by IBM.

To have your PC Planetarium shipped fast just send a check for \$52 and this coupon. Light Software, Drawer C, 389 Pine St., Menzies, San Francisco, CA 94104, Cal (415) 788-4578. Or ask at a computer store near you.

Name _____

Address _____

Zip _____

CIRCLE 334 ON READER SERVICE CARD

Precision Data Products
Complete Line of Quality Supplies for Your Computer

YEAR END SALE



C.O.D.

VISA

COMPLETE LINE OF 3M DATA RECORDING PRODUCTS

DISKETTES

5 1/4"	\$30.00 in Rebate Offers on Diskettes and Other 3M Products	\$1.09
	SSDDRH	\$1.49
	DSDDRH	\$1.95
	SSDD 96TPI RH	\$2.37
	DSDD 96TPI RH	\$2.89
3 1/2"	"SS Micro Diskette	\$1.89
	"DS Micro Diskette	\$2.59

Sold 10/88

ORDER NOW—LIMITED TIME OFFER



*Free Flip N'File with each box of 10 3.5" 5B or DS or 5 1/4" High Density (HD for IBM PC/AT Diskettes). LIMITED SUPPLIES

MINIMUM ORDER \$25.00. Add 10% for quantities less than 50. Prices subject to change without notice. Shipping and Handling \$4.00 per 100 diskettes. Reduced shipping charge for larger quantities. C.O.D. add \$4.00. MI residents add 4% sales tax.



Precision Data Products

P.O. Box 8347, Grand Rapids, MI 49508

(616) 432-2437 • Michigan 1-800-632-2469

Outside Michigan 1-800-258-0028



CIRCLE 123 ON READER SERVICE CARD

Contemporary ComputerWear

DUST COVERS FOR THE IBM PC



Attire your IBM PC in Style!

ComputerWear—Beige, 100% cotton canvas covers with grey trim and embroidered emblem. Order Now! Satisfaction guaranteed. Custom logo in quantity.

<input type="checkbox"/> Yes, protect my PC in style! Send me:	Printer (Epson FX-100, \$20
Keyboard \$18	NEC P3, Okidata 83, 93)
Monitor \$18	Printer (NEC 3550) \$20
Drive \$18	<input type="checkbox"/> Visa <input type="checkbox"/> MC <input type="checkbox"/> Check
1 pc Mon/Drive \$36	Add \$2.00 Shipping Total: _____
Printer (Epson MX/FX-80, . . . \$18	(California residents add tax)
Okidata 82, 92)	

Print Name _____

Address _____

City/State _____

Credit Card # _____

Zip _____

Exp. _____

Contemporary ComputerWear At: EM

1320-36th Ave., San Francisco, CA 94122 / (415) 759-1466

IBM is a registered trademark of IBM Corp. Dealer inquiries invited. PC-AT covers available.

CIRCLE 121 ON READER SERVICE CARD

KEY-FAKEing Keystrokes

Our programming *fakir* turns faker to con programs into thinking you're actually typing the keystrokes they need to get started.

"Press any key to begin" is a minor nuisance most of us can tolerate. But can you really live with the programs that don't maintain configuration files and require you to enter your printer port number before you start? Or all those that should have been designed to accept command line parameters but which walk you through a series of questions and answers instead? Even with normal programs, do you find yourself entering the same few start-up commands every time you use them?

Usually, there's not too much you can do about these annoying program preliminaries. You may have created batch files to change subdirectories and save much repetitive typing, but normal batch files don't help once your program begins to execute.

KEY-FAKE can. KEY-FAKE is a utility designed to extend the usefulness of your batch files by letting you supply all the necessary initial keystrokes to programs automatically. Indeed, in addition to handling program preliminaries, KEY-FAKE can even be made to run a whole program without any keyboard intervention on your part.

The Batch Stops Here

PC users with hard disk systems often assemble a collection of short batch files (often with one-letter names) that help to navigate through the invariable maze of subdirectories and programs. Yet once a program begins executing, it's on its own, and batch file processing doesn't take over again until you exit the program.

KEY-FAKE extends the power of batch files by filling just this gap. With

1985/No. 26

KEY-FAKE you can put program commands in your batch files as a series of keystrokes. When the batch file loads the program, these keystrokes are interpreted just as if you had typed them yourself.

From one perspective, it would seem that this facility is provided by DOS 2.0 (and later versions). It's called redirection of standard input, and it permits you to substitute a file for the normal keyboard input. Unfortunately, however, while redirection of standard input is useful in certain applications, it is not designed for and cannot be used to take care of your program preliminaries.

For one thing, redirection only works with programs that use DOS function calls to get keyboard information. Most large programs, however, use the BIOS Interrupt 16h for keyboard input instead. Another problem is that redirection of standard input is an all-or-nothing proposition. It doesn't switch back to the real keyboard when the redirected file ends. Thus, if standard input is redirected from a file that is exhausted while the program is still running, the program will hang. The only keystroke command to which the machine will then respond is the drastic one that uses three fingers.

Unlike redirection of standard input, however, KEY-FAKE works with programs that use the BIOS Interrupt 16h for keyboard input. More importantly, once KEY-FAKE runs out of keystrokes, it relinquishes control and lets you continue with the typing.



Whereis

\$29.95

Locate that program on the Hard Disk that you forgot the name and directory of.

Spiffy Program — 49.95

Printout graphics, text, etc. on a label designed with PC Paint. B/W printer.

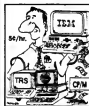
NoColor — 19.95

All characters & background made clear on monochrome screen. Works for games or business applications.

Orthogonal — 9.95

Thinker person's game of strategy based upon orthogonal movements.

Programs written for IBM/PC/XT/AT & Compatibles.



FILE TRANSFER + CONVERSION UTILITIES
149.95

Apple } To IBM PC/XT or AT version 224.95
TRS } compatibles
CP/M }
IBM PC <-> Tandy 2000 Disk Transporter 149.95

Ask for Transfer Service:
Macintosh to IBM PC
Pts to Pts (move in & out)



— 88¢ DS DD 50 qty.

MC/MSA/COD/CHECK OK
408/988-0164

■ PERSONAL
■ COMPUTER
■ PRODUCTS

3080 Olcott Dr. Ste. B130
Santa Clara, California 95051

IBM is a registered trademark of International Business Machines Corporation.
Macintosh is a registered trademark of Apple Computer, Inc.
Pits is a registered trademark of Software Publishing Corporation.

PROGRAMMING/UTILITIES

Getting KEY-FAKE

If you don't have a modem, you can simply type the KEY-FAKE.BAS program shown in Figure 1 into BASICA and run it to create KEY-FAKE.COM.

To save both time and typing mistakes, you can get a copy of KEY-FAKE via modem by calling *PC Magazine's* Interactive Reader Service at (212) 696-0360. If your communications software supports the

Xmodem protocol, you can download KEY-FAKE.COM directly. If not, you'll have to download KEY-FAKE.ASC. Rename the file KEY-FAKE.BAS, load it into BASICA, and run it. The program

```

100 REM -- BASIC PROGRAM TO CREATE KEY-FAKE.COM
110 OPEN "KEY-FAKE.COM" AS #1 LEN = 1
120 FIELD #1,1 AS A$
130 CHECKSUM = 0
140 FOR I% = 1 TO 67
150   LINESUM% = 0
160   FOR J% = 1 TO 8
170     READ BYTE%
180     CHECKSUM = CHECKSUM + BYTE%
190     LINESUM% = LINESUM% + BYTE%
200     LSET A$ = CHR$(BYTE%)
210     PUT #1
220   NEXT J%
230   READ LINECHECK%
240   IF LINECHECK% <> LINESUM% THEN PRINT "Error in Line";280 + 10 * I%
250 NEXT I%
260 CLOSE
270 IF CHECKSUM = 32118 THEN PRINT "Successful Completion!" : END
280 PRINT "COM file is not valid!" : END

290 DATA 233, 131, 0, 75, 69, 89, 45, 70, 712
300 DATA 65, 75, 69, 32, 40, 67, 41, 32, 421
310 DATA 67, 111, 112, 121, 114, 105, 103, 104, 837
320 DATA 116, 32, 67, 104, 97, 114, 108, 101, 739
330 DATA 115, 32, 80, 101, 116, 122, 111, 108, 785
340 DATA 100, 44, 32, 49, 57, 56, 53, 0, 391
350 DATA 0, 0, 0, 134, 1, 0, 251, 46, 432
360 DATA 128, 62, 53, 1, 0, 116, 9, 10, 379
370 DATA 228, 116, 10, 128, 252, 1, 116, 32, 803
380 DATA 46, 255, 46, 47, 1, 83, 46, 139, 663
390 DATA 30, 51, 1, 46, 139, 7, 67, 67, 408
400 DATA 46, 137, 30, 51, 1, 46, 254, 14, 579
410 DATA 53, 1, 91, 11, 192, 116, 207, 207, 878
420 DATA 83, 46, 139, 30, 51, 1, 46, 139, 535
430 DATA 7, 91, 11, 192, 117, 13, 46, 131, 608
440 DATA 6, 51, 1, 2, 46, 254, 14, 53, 427
450 DATA 1, 11, 192, 202, 2, 0, 199, 6, 613
460 DATA 0, 1, 0, 0, 198, 6, 2, 1, 208
470 DATA 0, 252, 140, 202, 43, 192, 142, 192, 1163
480 DATA 190, 0, 1, 139, 254, 185, 47, 0, 816
490 DATA 243, 166, 116, 44, 64, 142, 192, 59, 1026
500 DATA 194, 117, 237, 198, 6, 1, 0, 39, 792
510 DATA 43, 192, 142, 216, 161, 88, 0, 46, 888
520 DATA 163, 47, 1, 161, 90, 0, 46, 163, 671
530 DATA 49, 1, 250, 199, 6, 88, 0, 54, 647
540 DATA 1, 140, 14, 90, 0, 251, 14, 31, 541
550 DATA 190, 120, 0, 191, 134, 1, 38, 137, 819
560 DATA 62, 51, 1, 38, 198, 6, 53, 1, 410
570 DATA 0, 172, 152, 139, 200, 65, 11, 192, 931
580 DATA 117, 3, 233, 39, 1, 233, 155, 0, 781
590 DATA 0, 0, 0, 0, 0, 0, 0, 0, 0
600 DATA 0, 0, 0, 0, 0, 0, 0, 0, 0
610 DATA 0, 0, 0, 0, 0, 0, 0, 0, 0
620 DATA 0, 0, 0, 0, 0, 0, 0, 0, 0
630 DATA 0, 0, 0, 0, 0, 0, 0, 0, 0
640 DATA 0, 0, 0, 0, 0, 0, 0, 0, 0

```

(Figure 1 continues)

Figure 1: The BASIC program that will create KEY-FAKE.COM.

will create KEY-FAKE.COM for you.

You might also want to download KEY-FAKE.ASM, the assembly language listing, to see how the program works. If you have the IBM or Microsoft Macro Assembler, you can then use MASM, LINK, and EXE2BIN in the normal manner to create KEY-FAKE.COM.

Some Simple Examples

The best way to understand how to use KEY-FAKE and what it does is by looking at a few simple examples. Suppose that every time you enter BASIC you execute a COLOR command to create a blue border and background with yellow letters. With KEY-FAKE, you could create a two-line batch file (perhaps called B.BAT) to load BASIC:

```
KEY-FAKE "COLOR 14,1,1" 13 "CLS" 13
BASIC
```

After BASIC loads, it begins to check for commands coming from the keyboard. The first keystrokes it reads, in this case, are those that come from the KEY-FAKE parameter. Rule number one, then, is that KEY-FAKE must be executed before the

program that will use the keystrokes.

Anything placed in quotation marks in the KEY-FAKE parameter is interpreted as normal text, just as if you typed it in at the keyboard. Simple decimal numbers (like the 13) are ASCII codes for non-

Rule number one is that
KEY-FAKE must be
executed before the
program that will use
the keystrokes.

printable characters or control codes. A 13 is the Enter key, for example. Similarly, a 27 is the Esc key, a 9 is the Tab key, and an 8 is the Backspace key.

You may use single quotes or double quotes to delimit a text string. This is handy if you have to simulate a typed quote sign. If your text string must include a double quote sign, for instance, use single quotes as delimiters. (This is a neat trick used by the IBM and Microsoft Macro Assemblers to solve the perennial

quote-within-quote problem.)

You may also include the "extended ASCII" keys (decimal codes 128 through 255) as part of the KEY-FAKE parameter. These include the function keys, cursor movement keys, Alt-letter keys, Alt-number keys, Ins, and Del. These keys are specified in KEY-FAKE by the "@" sign (@) followed immediately by the extended ASCII code. (The extended ASCII codes may be found in the PC *Technical Reference* manual.) For instance, if you usually use the F3 key to load a program when you enter the BASIC interpreter, you could add that key to the end of the KEY-FAKE command:

```
KEY-FAKE "COLOR 14,1,1" 13 "CLS" 13 @61
```

Now let's look at some other examples. Let's suppose you have a really terrific spelling checker called SpelRite. The only problem is that it doesn't accept command line parameters. Every time you run SpelRite, it asks you for the name of the file you want to check and the subdirectory where the dictionary is located. You can fix this SpelRite problem with a two-line batch file called SR.BAT:

```
650 DATA 0, 0, 0, 0, 0, 0, 0, 0, 0
660 DATA 0, 0, 0, 0, 0, 0, 0, 0, 0
670 DATA 0, 0, 0, 0, 0, 0, 0, 0, 0
680 DATA 0, 0, 0, 0, 0, 0, 0, 0, 0
690 DATA 0, 0, 0, 0, 0, 0, 0, 0, 0
700 DATA 0, 0, 0, 0, 0, 0, 0, 0, 0
710 DATA 0, 0, 0, 0, 0, 0, 0, 0, 0
720 DATA 0, 0, 0, 0, 0, 0, 0, 0, 0
730 DATA 0, 0, 0, 0, 0, 0, 0, 0, 0
740 DATA 0, 0, 0, 0, 0, 0, 0, 0, 0
750 DATA 0, 0, 0, 0, 0, 0, 0, 0, 0
760 DATA 0, 0, 0, 0, 0, 0, 0, 0, 0
770 DATA 0, 0, 0, 0, 0, 0, 0, 0, 0
780 DATA 0, 0, 10, 172, 128, 62, 134, 2, 508
790 DATA 0, 116, 25, 58, 6, 134, 2, 116, 457
800 DATA 11, 42, 228, 171, 38, 254, 6, 53, 883
810 DATA 1, 235, 187, 144, 198, 6, 134, 2, 827
820 DATA 0, 235, 99, 144, 68, 64, 117, 8, 727
830 DATA 198, 6, 136, 2, 1, 235, 45, 144, 767
840 DATA 68, 34, 116, 4, 68, 39, 117, 6, 436
850 DATA 162, 134, 2, 235, 31, 144, 68, 48, 816
860 DATA 114, 26, 68, 57, 119, 22, 198, 6, 682
870 DATA 135, 2, 1, 44, 48, 134, 6, 137, 587
880 DATA 2, 246, 38, 138, 2, 0, 6, 137, 569
890 DATA 2, 235, 43, 144, 128, 62, 135, 2, 751
900 DATA 1, 117, 35, 168, 137, 2, 42, 228, 722
910 DATA 128, 62, 136, 2, 1, 117, 2, 134, 582
920 DATA 196, 171, 38, 254, 6, 53, 1, 198, 917
930 DATA 6, 135, 2, 0, 198, 6, 136, 2, 485
940 DATA 0, 198, 6, 137, 2, 0, 73, 116, 532
950 DATA 3, 233, 119, 255, 186, 134, 2, 195, 1127
```

(Figure 1 ends)

MAGNUM P.C.

800-544-4354

ORDERS
ONLY

COMPUTERS

IBM PC, XT OR AT YOU CONFIGURE	SAVE
COMPQ DESKPROS & PORTABLES	CALL
ERICSSON PORTABLE PC	NEW
AT&T 6300-PC	SAVE

EXPANSION CARDS

AST SIX PAC PLUS (64K & SIDERICK)	269
ADVANTAGE PREVIEW	399/278
EVEREX GRAPHICS EDGE	319
HERCULES GRAPHICS CARD	329
COLOR CARD	168
IRMA 3278 EMULATOR	799
ORCHID PC BLOSSOM & TURBO	CALL
PARADISE MODULAR GRAPHICS CARD	NEW
PROFIT SYSTEMS MULTIGRAPH	CALL
PERSYST TIME SPECTRUM	269
QUADRAM QUADBOARD (8K/164K)	225/269
STB ALL PRODUCTS	CALL
TECMAR GRAPHICS MASTER	459

DISK DRIVES

FULL HEIGHTS (FOR IBM)	FROM 110
HALF HEIGHTS (FOR IBM)	FROM 85
ALLOY PC-STOR/DCSTOR	CALL
AMPEX	CALL
EVEREX EXPANSION CHASIS	775
EXPANSION VU 10 - 20 MB	FROM 1395
CORE AT 20 - AT 72	FROM 1249
OMEGA BERNOLLI PLUS	2550
KAMERMAN LABS	
MASTERFLIGHT SYSTEM	CALL
KODAK 3.3 MB W/BACKUP SOFTWARE	662
PEACHTREE TECHNOLOGIES	FROM 699
TALLGRASS HARD DRIVES & TAPE	CALL

PC-JR ENHANCEMENTS

AST JR COMBO	CALL
RADORE DRIVE 2 ENHANCEMENT	449
10 MB ENHANCEMENT	SAVE
TECMAR JR CAPTAIN	325
JR WAVEJR 2ND MATE	SAVE

PRINTERS

CANON (FULL YEAR WARRANTY)	CALL
EPSON FX, RX, LX, LQ	CALL
ONIDATA ALL MODELS	BEST PRICES
SMITH CORONADO 160/200/330	199/299/419
STAR MICROINICS S16-1015	243/407
TOSHIBA P351/P1340	1225/579

MONITORS

AMDEK 390 (IBM PLUG-IN - AMDEK)	169
PGS MAX 126X-H	199/469
TAXAN ALL MODELS	CALL

SOFTWARE

SYMPHONY	475
MULTIMATE	249
SAMINA III	CALL
ENABLE	SAVE
COPY II PC	35
0-BASE II	399
FRAMEWORK	399
MODEMS 1-2-3	309

MODEMS

HAYES SMART MODEM 300/1200	199/399
1200B/1200	349/379
2400 BAUD MODEM	CALL
TRANSET 1000	CALL

ACCESSORIES

CHIPS 64K - SET OF 9	10
256K - SET OF 9	59
SWITCH BOXES MANUAL & AUTOMATIC	CALL

DISKETTES

BSAF 5 1/4" DS/DD (Each-lots of 10)	1.20
5 1/4" OS/DD (Each-lots of 10)	1.75
5 1/4" DS/HD IBM-AT (Each-lots of 10)	4.35
MAXELL 5 1/4" DS/DD (Each-lots of 10)	2.25
VERBATIM 5 1/4" DS/DD (Each-lots of 10)	2.25

1-800-544-4354

ORDERS
ONLY

FOR INFORMATION - (404) 441-3112
5965 PEACHTREE CORNERS EAST B-2
NORCROSS, GEORGIA 30071
AVAILABILITY AND PRICES SUBJECT TO CHANGE
APPROVED CORPORATE ACCOUNTS WELCOME

PROGRAMMING/UTILITIES

KEY-FAKE "H1" 13 "X"SPERITE" 13
SPERITE

When you enter SR followed by a filename, the name will be substituted for %1 when the batch file executes. KEY-FAKE then answers the two questions for you.

Suppose that *WordStar* on the office PC-XT is used both by beginners and experts. The beginners like a help level of 3, but the experts prefer a help level of 1. You could, of course, make a copy of the *WordStar* program and patch it and have two separate versions of *WordStar* on the system. Or, you could have one version of *WordStar* and two batch files by using KEY-FAKE. The first one (called WSB.BAT), for the beginners, just loads *WordStar*.

CD WORDSTAR
WS

The second batch file, for the experts (WSE.BAT), is similar except that it supplies the *WordStar* keystrokes to change the help level from the main menu

CD WORDSTAR
KEY-FAKE "H1"
WS

Several months ago a Power User patch (Volume 4 Number 16) on how to skip over the opening "Include error messages? (Y/N)" prompt in Turbo Pascal generated a lot of interest—much of it from people who couldn't get it to work with their particular versions of the Turbo compiler. There's really no need to make a patch. Just set up a batch file with KEY-FAKE. I call mine T.BAT:

CD TURBOPAS
KEY-FAKE "Y"
TURBO

How's that for simplicity? No patch, no DEBUG, no hexadecimal addresses, no problems with different Turbo Pascal versions. Just a simple Y typed by KEY-FAKE instead of you.

Some Heavier Stuff

Now for some more interesting applications of KEY-FAKE. How would you like to print several *WordStar* files using one batch command? Let's call this file WSP.BAT

CD WORDSTAR
:CHECK

IF %1==/ GOTO END
KEY-FAKE "P%1" 27 "X"
WS
SHIFT
GOTO CHECK
:END

You execute it by typing

WSP file1 file2 file3 ...

WSP.BAT uses the IF statement to check whether a parameter is present. If so, the filename parameter is substituted for %1 in the KEY-FAKE command. When *WordStar* begins executing, therefore, the first keystrokes it gets are P (for Print), the filename, an Esc (decimal 27), and X (for Exit). *WordStar* won't exit until it has finished printing, however. When it exits back to the batch file, WSP.BAT does a SHIFT command, making %1 the next file in the list, and goes through the routine again.

Some programs, like Lotus's 1-2-3, clear out the keyboard buffer when they load. This would ordinarily be a problem with KEY-FAKE, but KEY-FAKE has it licked. When the digit 0 appears in a KEY-FAKE parameter, it takes on special meaning. If a program checks to see if any keys are waiting, KEY-FAKE will say "No." The program thinks that no keys are available and the buffer is clear. When the program checks again, KEY-FAKE says "Yes" and delivers the next keystroke.

Since virtually every time I enter 1-2-3, I do a File Retrieve command, I have a batch file called L.BAT to load Lotus in a hurry:

CD LOTUS
KEY-FAKE "0 13 0 13 0 13 0 13 0 13" *FPA*
LOTUS

Make sure you have the system disk in drive A: before you run this one. The string of 0s and 13s was developed empirically, but it works well, skipping past the Lotus Access System Menu right into 1-2-3, ready for me to select a file. Use KEY-FAKE and you'll have to be really quick if you want to read that copyright notice one more time.

KEY-FAKE also helps out with some odd-ball batch file problems that may be difficult to handle with other methods. For instance, suppose you have a batch file that

changes the subdirectory, but at the end of the batch file you want to return to the directory from which it was executed. The top of the batch file could save the subdirectory with the following commands:

```
KEY-FAKE "CD" 26 13  
COPY CON RETDIR.BAT  
CD >> RETDIR.BAT
```

Here, KEY-FAKE supplies input to the subsequent COPY command. The keystrokes are CD, a blank, a decimal 26

If you have some applications involving several PC programs that you'd like to automate, then KEY-FAKE may be just the answer.

(Ctrl-Z or End-of-File), and a 13 (Enter). With these keystrokes, COPY creates a file called RETDIR.BAT in the root directory. This file contains only the characters CD and a blank. Then, when the CD command is executed in the third line, its output (the current directory name) is redirected and appended to the RETDIR.BAT file. Note the use of the double angle brackets for appending to a file rather than recreating it.

Now you have a file called RETDIR.BAT in the root directory that contains a CD command to return to the current subdirectory. The end of the batch file simply contains the following commands:

```
CD \  
RETDIR
```

This will then execute the batch file and return you to the subdirectory from which you started.

You could even develop KEY-FAKE parameters that carry programs through an entire task. For instance, you could import an ASCII table of numbers into 1-2-3, save it as a worksheet file, exit to the Lotus Access System menu, convert the 1-2-3 file to a .DIF file, and then run a BASIC program that used the .DIF file, all by executing one batch file.

Thus, if you have some applications involving several PC programs that you'd

like to automate but that now require manual keystrokes, then KEY-FAKE may be just the answer.

To recap the syntax, then, KEY-FAKE accepts anything within a pair of single or

double quotes as normal keystrokes. ASCII codes are specified by decimal numbers. Decimal numbers preceded by the @ symbol are extended ASCII codes. A zero (0) is a special code to signal to programs



A BETTER WAY TO...

DRAW, POINT, SELECT & POSITION

For graphics, and menu selection – for direct interaction with your computer – nothing beats a light pen. It's fast. It's natural. And unlike a mouse, it won't fight with you for desk space.

Over 7500 FTG light pens are in use world-wide – they're the undisputed standard for the IBM PC.

Software is available for graphics, education, 3278 emulation, and much more. Plus, our MOUSETRAP™ is the link to most programs that can use a mouse. And, if you do any programming, you'll find it easy to add light pen support to your own creations.

For added versatility, check out our new PXL-350 HI-RES LIGHT PEN BOARD. It's fully supported by the DR. HALO II™ graphics program.

The pen is \$195. The board is \$149 with single-pixel and TopView™ interface software. We back both with a 30-day no-risk trial privilege and a two-year limited warranty.

Call today to try them, or for more information.





FTG DATA SYSTEMS
soon to be GRAPHIC INNOVATIONS, INC.

(714) 995-3900
(800) 962-3900
(800) 972-3900 (Calif.)

10801 Dale, Suite M-2, P.O. Box 615, Stanton, CA 90680 Telex: 887840

that the keyboard buffer is clear. Anything else in the KEY-FAKE parameter is interpreted as "white space" delimiting valid parameters. The KEY-FAKE program does no real error checking.

The Inevitable Limitations

Naturally, there are some limitations with KEY-FAKE. The first is the length of the parameter. PC-DOS limits command line parameters to 127 characters, includ-

Smart books. Smart investment.
SAMS.

You made a smart investment when you bought a computer. When you buy SAMS books, you're making another smart investment. SAMS books keep you up-to-date on the latest developments and programming applications. And they give you a head start on getting the most out of your computer.

Gallium Arsenide Technology

Gallium arsenide has replaced silicon in the design of optoelectronic devices. In this comprehensive introduction to the structure and properties of this wonder compound, the author also explores its applications in analog and digital technology. Editorial contributions by leading experts document its applications in chip design, integration levels and monolithic microwave integrated circuits (MMICs). They examine the new band-gap engineering and the uses of MESFET integrated circuits, photodetectors and optical sources. An essential library edition for professionals in electronics-related fields. David K. Ferry, No. 22375, \$64.95



Computer-Aided Logic Design

An excellent reference source for electronics engineers who use computers to develop and verify the operation of electronic designs. The author uses practical, everyday examples such as burglar alarms and traffic light controllers to explain both the theory and the technique of electronic design. CAD topics include common types of logic gates, logic minimization, sequential logic, counters, self-timed systems and tri-state logic applications. Packed with practical information, this book is an excellent reference source for the growing CAD field. Robert M. McDermott, No. 22436, \$27.95

68000, 68010, 68020 *Primer*

Here's a user-friendly guide to one of the most powerful, popular families of microprocessor chips on the market. The authors show you how to use the 68000 series to its fullest potential: how to

program in Assembly Language, the fundamentals of code mapping, what causes file locks and how to minimize this problem, how to use various instructions and registers and how chips are used in multiuser systems. You can follow actual programming examples and use the handy tear-out instruction card for quick reference. Get the most out of your computer with the 68000 and this book. Kelly-Boote and Fowler, No. 22405, \$18.95

Make the smart move and order SAMS books at your local bookstores, fill out and return the order form below or call and ask for Operator 559.

800-428-SAMS
in Indiana
call 317-298-5566

SAMS—

Howard W. Sams & Co., Inc.
A Subsidiary of Macmillan, Inc.
4300 West 62nd Street
Indianapolis, IN 46268

Quantity	Price
Shipping & Handling	\$ 2.00
MC, CA, FL, IL, IN, NC, NY, OH, TN, WV	
residents add local sales tax	
Total	\$
Name	
Company	
City	
State	Zip
Daytime Telephone No.	
<input type="checkbox"/> Bill my credit card	<input type="checkbox"/> VISA <input type="checkbox"/> MasterCard
Account No.	Exp. Date
Signature (required)	
<input type="checkbox"/> Check or money order enclosed	
Make checks payable to: Sam's & Co., Inc.	
Mail this form with payment to:	
Sam's & Co., Inc.	
Dept. 126 • 4100 West 42nd Street • Indianapolis, IN 46226	

284 170

Prices subject to change without notice

ing the blank that separates the parameter from the program name and the final carriage return. This limits the number of keystrokes that KEY-FAKE can fake. If the entire KEY-FAKE parameter is a string beginning with a quote and you leave out the final quote (which is allowable), you'll be able to squeeze in 124 keystrokes.

If a KEY-FAKE command is executed before a previous KEY-FAKE command has exhausted its stored keystrokes, the second execution will write over the re-

Although KEY-FAKE is resident in memory, it may be executed an unlimited number of times during a single PC session.

maining keystrokes from the first. Watch out for this if you're nesting batch file executions.

Some programs get keyboard information directly from the hardware keyboard interrupt and will thus bypass KEY-FAKE. Until XyQuest fixes their word processor (or comes out with a new version), KEY-FAKE will be entirely ignored by XyWrite II. [Are you listening, Xy-Quest?—Ed.]

Some programs continuously monitor the keyboard and retrieve keystrokes even if they are not able to use the keystrokes immediately. This means that you may find that KEY-FAKE will not work well when you are on-line using a communications program.


KEY-FAKE cannot simulate keystrokes not supported by the PC BIOS, such as Alt-Home. Nor can it create different keystrokes for the two different Plus and Minus keys, which are used as separate commands by some programs (most notably *Framework*).

These are not serious limitations, however. For most applications you'll find that **KEY-FAKE** works fine.

The Inner Workings

Although KEY-FAKE is a program that remains resident in memory, it may be executed an unlimited number of times during a single PC session. KEY-FAKE

CIRCLE 378 ON READER SERVICE CARD



CompuServe

If you could get your investment information where Wall Street gets its investment information, you'd get it from us.

CompuServe Information Services put the most accurate, comprehensive investment information available at your fingertips.

Now more than ever, individual investors are joining the ranks of the most prestigious Wall Street firms who depend on CompuServe to provide them with a broad spectrum of comprehensive financial information for research, portfolio management and merger/acquisition strategies.

Instant retrieval of continuously updated quotes on over 10,000 issues and 10-years of daily historical pricing on over 50,000 securities.

Standard & Poor's descriptive information on more than 3,000 companies.

Value Line Data Base II extensive fundamental data to analyze the performance of more than 1,800 major corporations.

Disclosure II descriptive and financial information derived from SEC filings for over 8,500 companies.

Institutional Broker's Estimate System (I/B/E/S) earnings projections on over 2,800 widely followed companies.

The World of Lotus useful and timely information about Lotus products and services, including reference information about after-market Lotus related products and forums for I-2-3, Symphony and Jazz maintained by Lotus.

Reports on technical market trends, personal portfolio evaluation and the most comprehensive analysis capabilities currently available.

You get all this plus demographic information on every zip code in the U.S., access to consultants through the Geneva Series, state of the art electronic communications, the full scope of the prestigious AP Wire Services, travel information and reservations and more of the high quality financial information that has made CompuServe

the premier supplier of investment information to the greatest names on Wall Street.

To buy a Subscription Kit, see your nearest computer dealer.

To receive our informative brochure or to order direct, call or write:

Name _____
Address _____
City _____
State _____ Zip _____

CompuServe®

Information Services
P.O. Box 20212
5000 Arlington Centre Blvd.
Columbus, Ohio 43220

800-848-8199

In Ohio, Call 614-457-0802

An H&R Block Company

WS-1212

Bet you can't do this!

Imagine a new software combination that lets you enhance the graphics generated by ANY program, then print out those graphics in the middle of ANY word processor, spreadsheet or other application. All while running in the background with Wordstar, Lotus 1-2-3, or other programs you already use.

The software programs that can do

this are **The Graftix Partner**, and **Inset-The Graphics and Text Integrator**.

The **Graftix Partner** lets you enhance the graphics generated by Lotus 1-2-3, ChartMaster, Energaphics, or any program, without ever leaving the program.

Inset lets you print out integrated graphics with DisplayWrite, Multimate,

or any program, using the print function of your program—no special preparation is ever needed.

And with both programs running in the background, when you want to make a last minute change to your graphic while using your word processor, you can call the image and edit it without ever leaving your word processor, spreadsheet, or other program.

INSET

The Co-Resident Graphics and Text Integrator

■ MERGES GRAPHICS & TEXT

- on the same line
- on the same page
- in the same document

■ EDITING CAPACITY

- size your image
- rotate the image
- assign gray scales
- clip the image

■ PRINTER SUPPORT

- color printers
- laser printers
- ink jet printers
- most popular printers
- sizing, rotation, & gray scale

■ MACRO CAPABILITY

■ PASSWORD PROTECT Important images

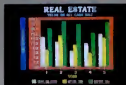
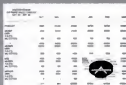
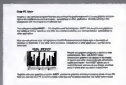
■ TELECOMMUNICATE over standard E-Mail

■ NON-COPY PROTECTED

- supports networks

■ AND...

your document is printed with graphics and text merged using the print function of your word processor, spreadsheet, or other application—with no special preparation



GRAFIX PARTNER

The Co-Resident Graphics Enhancement Utility

■ INSET / EDIT MODE

- 3-D Lotus bars & pies with a single keystroke
- capture and edit black & white text screens
- vertical & slanted text
- block expand & contract
- block rotation & centering
- snap-to grids for scaling
- improved I/O handling
- network support
- no more copy protection

■ ENHANCES IMAGES CREATED BY ANY SOFTWARE

- add text in multiple fonts
- move things around
- transfer art & logos between programs
- create impact with color
- highlight, airbrush, rubberstamp

■ NEW PRINTER SUPPORT

- color printers
- laser printers
- ink jet printers
- most popular printers
- sizing, rotation, & gray scale

■ POLAROID PALETTE supported

■ SLIDE SHOW manager provided

■ MICROSOFT MOUSE supported



The Partners Can!

Always just a keystroke away

INSET \$149. GRAFIX PARTNER \$149.
THE PARTNERS \$249.

To order, mail form below today, or **CALL 315 / 474-3400**

☐ INSET ☐ GRAFIX PARTNER ☐ THE PARTNERS (BOTH)

NAME

ADDRESS CITY ZIP

☐ VISA ☐ MASTERCARD EXPIRATION DATE

CARD NO

SIGNATURE



120 E. Washington St.,
Suite 421
Syracuse, NY 13202
315/474-3400

INSET

the graphics and text integrator

Inset is a trademark of American Programmers Guide Ltd. Lotus 1-2-3 is a trademark of Lotus Development Corp. Multimate is a trademark of Multimate International. Wordstar is a trademark of International Business Machines. The Graftix Partner is a trademark of Brightwell-Roberts and Company, Ltd.

PROGRAMMING/UTILITIES

only installs itself in memory the first time it is executed; subsequent executions take up no extra memory.

The first time KEY-FAKE is run, it saves the vector address of Interrupt 16h and substitutes an address to its own routine. It then decodes the parameter into keystrokes and saves them in its own internal buffer. The decoding of the parameter accounts for about half of KEY-FAKE's code.

Most large programs use Interrupt 16h to get keyboard information. (Smaller programs, like the DOS utilities, use the DOS Interrupt 21h to get keyboard information, but ultimately Interrupt 16h is invoked anyway.) Normally, the PC's ROM BIOS answers an Interrupt 16h by just fishing keystrokes out of a small buffer that it maintains and handing them back to the calling program. The keystrokes get in the buffer through the much more complex Interrupt 9h routine in the ROM BIOS. (Interrupt 9h is a hardware interrupt generated whenever a key is pressed. The routine in the ROM BIOS gets the scan code of the key and must decode it into an ASCII or extended ASCII code before putting it in the keyboard buffer.)

After KEY-FAKE is loaded, it intercepts Interrupt 16h calls and passes back keystrokes from its own internal buffer to the calling program. When no more keystrokes are left, it simply lets the original Interrupt 16h operate normally.

Subsequent executions of KEY-FAKE do not remain resident in memory. KEY-FAKE searches through memory for its copyright notice. If it finds it, it knows that the program has been executed before. It then uses the keystroke buffer area allocated during the first execution and only has to decode the parameter.

Any Better Ideas?

Although I've shown you a few examples of how to use KEY-FAKE, the best uses of the program will be those you cook up to automate your own applications. Batch files are a big help in themselves, but KEY-FAKE really gives them a real boost in power. And it's always nicer when your PC does your typing for you. ■

Charles Petzold is a contributing editor of PC Magazine.

NOW BETTER PRINT-QUALITY IS JUST A KEYSTROKE AWAY.

LETTRIX.

With LETTRIX™ your **IBM ProPrinter, Epson, Okidata, IBM Graphics, Star Gemini, or Panasonic** printer can print proportionally-spaced and microjustified letter-quality text directly from all software. This entire advertisement is an **actual-size** photograph of text printed from a word-processing program on a \$300 Epson printer controlled by LETTRIX.

Before: ABCDEFGHIJKLMNOPQRSTUVWXYZabcdef
After: ABCDEFGHIJKLMNOPQRSTUVWXYZabcdef

LETTRIX resides in memory between your software and printer, responding automatically to justification, spacing, paging, margins, boldfacing, underlining, *italics*, subscripts and superscripts. You just print as you would normally from within your word-processor.

"A fun program that is easy to use." -- **PC WEEK**
"The sharpness and clarity nearly equals that of an expensive daisy wheel printer." -- **THE NEW YORK TIMES**
"Surprisingly low price." -- **BOARDROOM REPORTS**
"LETTRIX is the top of its class."
-- Ronni and Harry Geist, **PC PRODUCTS**, August 1985

Design your own typefaces, or use the 20 included: Broadway, Courier, Old English, Art Deco, **OUTLINE**, **KEEKEEKEE**, Engraved, *Paisa Americana*, WESTERN, **SHADGW**, Roman, BANKER, Gothic, Prestige, Folio, ORATOR, OCR-A, the entire IBM mathematical/line-drawing character set, as well as Français, Español, Русский and Ελληνικός.

You can control LETTRIX features either by accessing a menu that pops-up over your current software, or by placing simple single-character commands in your text.

For fastest delivery, charge LETTRIX to your VISA or MasterCard by dialing (800) 351-4500. LETTRIX™ costs just **\$98.50**. We pay all shipping.

SIXTY-DAY MONEY-BACK GUARANTEE. NOT COPY-PROTECTED. Call and mention this magazine for a free print sample. LETTRIX requires an IBM PC, XT, AT, or compatible with 50kb of free memory, and DOS version 2.0 or greater.

HAMMERLAB CORPORATION 5700 ARLINGTON AVENUE
(203) 566-999 RIVERDALE, NEW YORK 10471

If you can strip, strap, or straddle your options, you can take on Wall Street.

And if you don't know a *put* from a *call*, then maybe you should invest in the Wizard of Wall Street.

This highly realistic stock market simulation is a challenging game for aspiring financial pros. And an excellent introduction to the intricate world of securities trading for the beginner.

Now you can practice and perfect your skills without risk—in an environment that simulates the actual pace and pressure of Wall Street trading.

It's the most authentic stock market program you can find.

REAL-TIME MARKET ACTION.

You have to think quick, act fast, but also weigh factors such as current news, a stock's history, and trends in the industry. You'll need to read research reports, scan the headlines, evaluate the risk—then buy or sell.

And if you hesitate too long, you may miss a golden investment opportunity.



If you've ever wanted to take a walk on the wild side of Wall Street, this should be your first step.

BUY AND SELL JUST LIKE THE PROS.

A detailed glossary (included with the program) provides definitions of the Wall Street jargon: *put*, *call*, *short*, *long*, *strip*, *strap*, *straddle*.

You'll buy and sell with cash or on margin. You'll take the high-risks in trading options, buying and selling, and borrowing just like the real hustle-bustle activity on Wall Street.

THE THRILL OF THE BIG BOARD.

Open the door to life on The Exchange, where ticker tape reports, scrolling headlines, and constant market activity influence every trader's decision.

WIZARD OF WALL STREET



You'll get your information from detailed graphs, earnings reports, and newspaper stories.

But the big decision—to buy, sell or hold—is up to you.

TURN A COOL MILLION—OR MAYBE LOSE IT ALL.

You can buy and sell from 12 to 24 stocks and options in 6 different industries.

You'll have 12, 18, or 24 trading sessions, each representing a month of market activity, to increase your net worth. You could make a million in one or two simulated years—or maybe lose it all!

Market activity gets harder to predict as you advance to a higher level of complexity. But the higher the level, the greater the risk, and the better the action.

TEST YOUR STOCK MARKET SAVVY.

Uncle Buckracker leaves you \$50,000—but his will stipulates you must play the stock market with the money. Can you increase his legacy with your skill—or will you take too many risks and lose it all?

The Wizard of Wall Street is the only way in the world you can risk playing the stock market—without losing your shirt.



synapse

A BRIDGERUNDS SOFTWARE COMPANY

WIZARD OF WALL STREET is available for IBM PC/TC-X/PCjr and compatibles. For more information about Synapse products, please write us at 17 Paul Drive, San Rafael, California 94903-2101. IBM is a registered trademark of International Business Machines Corporation. © 1985 Synapse Software.

CIRCLE 475 ON READER SERVICE CARD

Spreadsheet Clinic

This forum lets readers exchange the ingenious solutions and timesaving hints that make their spreadsheets and integrated software packages work better.

Date Stamping Your Files

It's often handy to know when you last updated your 1-2-3 spreadsheet. The @TODAY function by itself won't do the job because any cell that contains it will show the current date, not the date on which the file was saved. You could manually enter the current date when you saved your spreadsheet, but the macro in Figure 1 is a better solution. To use it, first choose a cell in the worksheet where you want the date stamp to appear. Range-name the cell UPDATE and give it a date format. Now, when you are ready to exit your spreadsheet, hit Alt-D. The @calc in the macro will ensure that the date stamp is permanent. The rest of the macro saves the worksheet.

Sammy Chan
Brockport, New York

Many people use a macro to save or print a worksheet. A date stamp is a good thing to include in it.

Utility Macros

Figure 2 contains a few 1-2-3 utility macros I have found useful enough to be worth sharing. Depending on the kind of model you are building, you may find them handy to have in your worksheet from the beginning.

It's very common to write a formula, such as A12/B16, in which the values in the formula depend on other cells. Occasionally, one of those cells may have the value zero. If the formula calls for multiplication by zero, there's no problem, but if B16, for example turned out to be zero, the formula would now call for division by zero and you'd get an ugly "ERR" message. The first macro, @E, is a cosmetic device to get rid of that message and display a zero instead. Just replace CELLX with the range name or address of the value that might be zero. The macro tests CELLX to

see if it's zero and if it's not, it leaves your formula alone. To use the macro, move the cursor to the cell with the formula in it and hit Alt-E.

The second formula speeds up the @SUM function when you want to total a

Updating a List

I have found a quick way to locate and update an entry in a list. The example I have chosen, shown in the top part of Figure 3, is a list of students. It is arranged by student number and has spaces in column E

```
<D: {goto}UPDATE"@today{celc}"/&FILENAME">
```

Figure 1: A macro that date-stamps and saves a worksheet.

```
<E {edit}{home}@if{CELLX=0,0,{end}}" Eliminate "ERR".
<S @sum{end}{up}. {end}{up}" Speeds up @sum.
<P {edit}{home}{end}*100"/&F2"" Switch to percent.
```

Figure 2: Three utility macros.

column of numbers. Just move the cursor to a cell two rows below the column to be totaled and hit Alt-S. If you want the total put immediately below your column of numbers, remove the first {end} from the macro and run it with the cursor in the cell just below the column. Note that other @functions, like @MIN, @STD, @VAR, @AVG, and so on will work in the same macro.

My third macro converts a decimal number into a percent. While you can do the same thing with 1-2-3's own percent format, you always get the % sign shown along with your number. The macro is handy if you have a column in a spreadsheet that is titled "Percentage," and you don't want a % sign in every cell. Using the macro, all you have to do is move to the cell you want to edit and hit Alt-P.

Larry Stephey
Irving, Texas

These are all good utilities. The second two could also easily be made into looping macros that would perform the same operation on a series of cells rather than on just one cell.

for exam scores. Let's assume that you want to update each student record by entering exam scores. When you run the macro, it prompts for the student number and then for the exam score, which it enters in the appropriate cell in column E. The macro will loop until you enter a student number of zero.

Since 1-2-3 provides no easy way to locate an item in a list, I have used a vertical lookup table in which the student number is matched with the cell numbers in column F. These numbers are nothing more than the row numbers in the worksheet. NRANGE in this case is C6..F11. Once the macro has found the row number that matches the student number, it combines the row number with an "E" to make a cell address for the test score, to be entered in column E. The macro prompts for the score, which it enters at that address.

Paul Hunter
Okemos, Michigan

1-2-3's data commands give you many different ways to extract records from a database but no easy way to go to them. Mr. Hunter's macro does not use data com-

SPREADSHEET CLINIC

mands at all but instead acts like a data command that 1-2-3 would have done well to include. John Nawrocki offered another approach to this problem in the *Spreadsheet Clinic* of September 3, 1985 (Volume 4 Number 18).

I've found that it is very helpful to give a range name to the entire subroutine macro, not just to the first cell. The operation of the macro is unchanged because a GOTO command always takes you to the first cell anyway. But now I can use

target ranges as you would normally, but just be sure they are in the same range. You'll get a quick recalc of only the cells you need.

Ronald Seaman
Decatur, Georgia

	C	D	E	F	G
4	NUMBER	NAME	SCORE	CELL	
6	679	JOHN PIKE	78	6	
7	683	EVA MORRIS		7	
8	692	TOM CLARKE		8	
9	966	DAVID BROWN	86	9	
10	957	SAM REINDEL		10	
11	967	ALF GARNETT		11	
12					
13					
14					
15	\R	{goto}ADDR		Goto cell D21	
16		/ENTER STUDENT NUMBER:	"SH"	Prompt for No., store in D28	
17		/xl{SH<=}&"/xgQUIT		Test to quit routine	
18		@lookup(SH,RANGE,3)		Find cell number (Col. F)	
19		{edit}{calc}{home}E		Make cell number an address	
20		{goto}		Goto	
21	ADDR	/rncSCORE{be}"		Storage cell for address	
22		/xENTER SCORE: "SCORE"		Name current cell SCORE	
23		/rncSCORE		Prompt for score	
24		/xg		Delete range SCORE	
25		/xg		Loop to beginning	
26	QUIT	{home}/xg		Quit	
27					
28	SH			Storage cell for number	

Figure 3: A macro that updates records.

The most useful part of Mr. Hunter's macro is the address location routine in cells D15 to D21. Once you've found a record, what you do with it is up to you. Rather than include an update routine (as Mr. Hunter has in cells D22 to D24), you might prefer to end the macro at cell D21 and update the record manually.

The macro wouldn't be much help if you needed to update every single listed item—for that you might as well go through each item, row by row. It's very useful, though, when you need to locate a few items in a long list. With slight modifications, the macro will work with Symphony, which also lacks a go-to-a-specific-record command.

Naming and Storing Macro Routines

Whenever I write a complex 1-2-3 macro, I split it into separate routines, each with a name that describes its function. I can then call these routines from a single "main-line" macro, similar to the subroutine calls of structured computer programs. After the subroutine runs, it hands control back to the main program.

/Worksheet Move to move the macro around within the worksheet. Even better, I can make a library of subroutines, saving them together in one spreadsheet under descriptive names. Whenever I need a subroutine in my current spreadsheet, I read it in from disk with /File Copy Combine Name.

Andrew Farber
Tampa, Florida

Recalculating Values in Individual Cells

When you work with large spreadsheets, it sometimes takes 1-2-3 a long time to recalculate. Fortunately, you can set the program to do manual recalculation, so that it updates values only on command. However, you may sometimes need to recalculate only a single cell or a small range of cells, in which case it's a bother to have to wait for an update of the entire spreadsheet.

The solution is to copy a cell, or range of cells onto itself. If you want to update the value of a single cell, move the cursor to it and hit /C followed by two Returns. For a range of cells, define both the source and

This is a good solution to an annoying problem. 1-2-3, however, doesn't recognize it as a solution. Even if you copied an entire spreadsheet onto itself and got a complete recalculation, you would still have a CALC message at the bottom of your screen, meaning that 1-2-3 thinks you still need to recalculate.

Maintaining a Securities List

We use 1-2-3 to keep track of investments, and often we need to print out a list of only those which have yet to mature. We use

When you work with large spreadsheets, it sometimes takes 1-2-3 a long time to recalculate.

Fortunately, you can set 1-2-3 to do manual recalculation, so that it updates values on command.

one row of a spreadsheet per investment, with maturity dates in column A. The first macro shown in Figure 4 sends the cursor to the beginning of the maturity date column and then tests each date to see whether it was earlier than a certain date—in this case, today's date. The macro will then delete every investment that matured before today. When it reaches a maturity date of today or later, it prints a report of predefined dimensions called RANGE.

Paul Kinney
Louisville, Kentucky

This is a simple, clean macro, but two things about it worry me. The first is that it stops working as soon as it runs into a maturity date that is today or later. This means that all your securities have to be in proper date order. In case your securities get rearranged, or if you'd rather order them in some other way, I have written a

SHIFT YOUR HARD DISK BACK INTO HIGH GEAR

with
disk optimizer

ONLY
\$49.95*

Special Introductory Price

Tunes Your Disk Files For Highest Performance

The Disk Optimizer organizes your disk to make your PC run faster. You'll discover faster program loading, faster file loading and sorting, faster file creation, faster backups to diskette. And the disk Optimizer reduces the chances of error during your disk I/O.

BEFORE DISK OPTIMIZING

CC	AA	DDD	D	BB	FF	GG	AAA	H	BB	JJ	JJJ	AAA	BBB
CC	AA	DDD	D	BB	F	GG	AAA	H	BB	JJ	JJJ	AAA	BBB

AFTER DISK OPTIMIZING

AAAAAAA	BBBBBBB	CC	DDDD	E	FFF	GG	H	JJJJJ
AAAAAAA	BBBBBBB	CC	DDDD	E	FFF	GG	H	JJJJJ

DOS IS SLOWING YOU DOWN!

Whether you realize it or not, the more you use your hard disk, the slower it is likely to react. This is because the operating system (PC-DOS/MS-DOS) stores things (programs, overlays, batches, etc.) randomly, wherever unused disk space is available. Your operating system doesn't keep pieces of the same file together. This means slower access time. Lost speed. Lost productivity.

TURN THE THROTTLE BACK UP!

Now, the Disk Optimizer puts the zip back into your hard disk! The Disk Optimizer collects all the scattered pieces of your files and re-stores them together in neat, well-organized areas on your disk. The result: immediate performance improvement . . . faster loading programs (and their overlays) . . . faster sorting . . . faster loading and storing spreadsheets or document files.

BONUS EXTRAS — at no extra cost

- ✓ **DISK ANALYZER**
Displays a visual performance analysis . . . shown in percentages . . . for any disk or diskette.
- ✓ **PERSONAL FILE SECURITY**
Password protect any file or program.
- ✓ **FILE PEEKER**
Now you can visually examine any file on your system.

ONLY **\$49.95***

*Plus \$5.00 Shipping & Handling

**SOFTLOGIC
SOLUTIONS**

Creators of DoubleDOS

530 Chestnut Street, Manchester, NH 03101
1-800-272-9900. In NH, call 627-9900
Disk Optimizer works with IBM PC's and true compatibles.

Order Toll-Free:
1-800-272-9900



CIRCLE 488 ON READER SERVICE CARD

SPREADSHEET CLINIC

macro—the second one in Figure 4—that looks through the entire column of dates and deletes only those investments that

I have written a 1-2-3 macro that looks through the entire column of dates and deletes only those investments that have already matured.

have already matured. This way the dates don't have to be in order.

My other worry about this macro concerns the print range. If you are deleting an unknown number of rows from the worksheet, how do you know what your final print range is going to be? You might want to include a print macro that would

figure out how large your spreadsheet was before printing it. Such a routine was included in the Spreadsheet Column of August 20, 1985 (Volume 4 Number 17).

Contribute to the Clinic

Share your latest spreadsheet discovery through PC Magazine's Spreadsheet Clinic.

We'll pay you \$50 for anything we print, plus an extra \$25 if you submit it on a disk. If you send a disk, please include a printout of your submission.

Mail your contributions to Spreadsheet Clinic, PC Magazine, One Park Avenue, New York, NY 10016—or send them to our electronic mailbox via MCI mail. ■

Macro 1.		
\X	{goto}A5~	Goto date column
TEST	/xIA5<@today~/xgDEL~	Test date, goto DEL
DEL	/pprRANGE"99	Print RANGE
	/wdr~/xgTEST~	Delete row, goto TEST
Macro 2.		
\Y	{goto}A5~	Goto date column
START	/encCURCELL"{}~	Name current cell CURCELL
	/xICURCELL="8"/xq	Quit if CURCELL is blank
	/xICURCELL<@today~/xgDELETE~	Test CURCELL, goto DELETE
	(down)/xgSTART~	Down one row, goto START
DELETE	/wdr~/xgSTART~	Delete row, goto START

Figure 4: Two macros that delete out-of-date entries.

THE BEST PC TEXT EDITOR JUST GOT BETTER.

ANNOUNCING SPF/PC™ 1.82

The best full screen editor for the IBM PC now extends support for large files to all PC's, not just the IBM/AT. Invoke your favorite program/compiler from within Edit at any time regardless of file size. CTC's SPF/PC™ 1.82 still looks like its mainframe cousin but executes faster with more options.

NEW FEATURES

- **PAGING** - Editing limited only by capacity of expanded/extended memory or hard disk.
- **SPEED** - Search 1,500,000 byte file with IBM AT in less than 13 seconds. By comparison, the IBM 3081 mainframe takes 48 seconds.

\$195

UPGRADES only \$50
ADD \$6 shipping
Canada \$10, Foreign \$15



Payment in U.S. funds by check or bank wire (Bank of America, San Francisco account 05583-05454).
Net 30 to D&B rated firms.

- Compatible with IBM and Novell Networks
- Modifiable HEX display
- Line length to 954 bytes

Minimum Requirements:
DOS 2.00-3.10, 192KB memory, any IBM PC or true compatible or TI Professional.



Command Technology Corporation
1800 Mountain Boulevard
Oakland, California 94611

TO ORDER Telephone: (415) 339-3530
SPF/PC.... Telex: 509330 COMMAND TECH

CIRCLE 154 ON READER SERVICE CARD

Buy A Local Area Network For Less Than \$100 Per PC

CIRCLE 519 ON READER SERVICE CARD

Power User

Push your hardware and applications software to the limit with these productivity-enhancing tips from readers.

An Even More Personal Editor

The IBM *Personal Editor* supports user-defined keyboard macros that are based on its internal interpretive command language. While the documentation provides some instruction on how to create them, studying the PE.PRO file supplied with the product and experimentation will give you more insight into *Personal Editor* macros than reading the manual can.

It turns out that you can provide *Personal Editor* with several common word processing functions that are ordinarily not there when you boot the program. A macro definition comes in three parts:

1. The "def" command.
2. The key to be used, along with its shift state and followed by an equals sign (=). Shift states are defined as s- for ordinary shift, a- for alternate key shift, and c- for control key shift.
3. The *Personal Editor* interpreter commands (enclosed in square brackets []), along with any associated text (enclosed in single quotes '). The interpreter commands are all well documented in the *Personal Editor* user manual. Following are some of the macros I find useful. The first is followed by an explanation; the others follow the same rules.

Make Marked Area Uppercase:

```
def a-6 = [uppercase]
```

This macro "defs" the Alt-6 key combination to turn a marked block of text into all uppercase letters. The "def" statement starts things off, a-6 defines the Alt-6 combination, and [uppercase] is a *Personal Editor* interpreter command.

Make Marked Area Lowercase:

```
def a-7 = [lowercase]
```

Move Cursor to Next Word:

```
def a-9 = [tab word]
```

Move Cursor to Previous Word:

```
def a-8 = [backtab word]
```

Make Word Lowercase:

```
def c-f1 = [unmark] [tab word] [left]
```

```
[mark char] [backtab word] [mark char]
[end mark] [right] [lowercase] [unmark]
```

Make Word Uppercase:

```
def c-f2 = [unmark] [tab word] [left]
[mark char] [backtab word] [mark char]
[end mark] [right] [uppercase] [unmark]
```

Make Word Lowercase with Uppercase

First Letter:

```
def c-f3 = [unmark] [tab word] [left]
[mark char] [backtab word] [mark char]
[lowercase] [unmark] [mark char] [upper-
case] [unmark] [tab word]
```

Delete Word:

```
def c-f3 = [tab word] [split] [backtab
word] [erase end line]
```

Delete Cursor to End of Word:

```
def a-h = [unmark] [mark char] [tab word]
[left] [left] [mark char] [begin mark] [de-
lete mark]
```

Duplicate Current Line:

```
def a-a = [unmark] [mark line] [copy
mark] [unmark] [down] [begin line] [first
nonblank]
```

Larry I. Schwartz
Walkersville, Maryland

Good show. The ability to customize Personal Editor can be extended to any application you want, and Mr. Schwartz's suggestions are helpful both when using it for ordinary programming work (my favorite use for it) and for word processing. A quick thumb trip through the user manual will give you even more ideas about how to improve IBM's fine text editor.

Be sure that you type each macro command sequence on a single line (which can be up to 255 characters long), even though we've had to break the lines in order to print them here. If you don't, Personal Editor won't understand what you want it to do.—John Dickinson

Function Key Colorer

Although MicroPro's WSCOLOR.BAS program lets me change the color of Word-

CopyWrite

BACKS UP IBM PC SOFTWARE

Hundreds of the most popular copy-protected programs are copied readily. CopyWrite needs no complicated parameters. It needs an IBM Personal Computer, or an XT or an AT, 128k bytes of memory, and one diskette drive. CopyWrite will run faster with more memory or another drive.

CopyWrite is revised monthly to keep up with the latest in copy-protection. You may get a new edition at any time for a \$15 trade in fee.

CopyWrite makes back up copies to protect you against accidental loss of your software. It is not for producing copies for sale or trade, or for any other use that deprives the author of payment for his work.

To order CopyWrite, send a check for \$50 U.S., or call us with your credit card. We will ship the software within a day.



Quaid Software Limited

45 Charles Street East
Third Floor
Toronto, Ontario M4Y 1S2
(416) 961-8243

Ask about ZeroDisk to run copy-protected software from a hard disk without floppies.

Star's text and menus, it doesn't change the colors of the function key assignment line on line 25. While it's possible to add color to line 25 using DEBUG, 80 different locations are involved, so I wrote WSPATCH.BAS (see Figure 1) to do the patching automatically.

This version works only on WordStar, Version 3.3 and later. Note that the program uses the hex offset as DEBUG shows it and adjusts for the 100h byte offset of .COM files.

Henry N. Bearman
Fort Worth, Texas

Mr. Bearman's original program was much more complex, allowing different filenames, high intensity colors, etc. We distilled it and added several needed error traps. While this works like a charm, it applies uniform color choices to the entire 25th line. Since WordStar maintains a separate attribute byte for each character on

the line, users who want variegated colors will have to patch WS.COM with DEBUG.

This program now checks to see whether your version of WordStar is 3.3 or later. If MicroPro comes out with a 3.4, 3.5, etc., it will still work. However, if the company introduces a Version 4.0, with the function key labels still starting at address &H5067, change the beginning of line 160 to read

```
GET 1,132:IF VAL(AT$)<4
```

and change the "3.3x" in the line 160 message to "4.x"—but keep the rest the same.—Paul Somerson

More Po-Word-ful Underline for the Epson FX

One of the problems with Microsoft Word's Epson FX-80 printer driver (EPSONFX.PRd or EPSONFXQ.PRd) is that, whatever font you select, it creates a feeble-looking underline, using the Epson

graphics print mode. There is a simple solution to this problem that uses Microsoft's CONVPDR program (which is supplied on the Word Utility disk) to modify the .PRd file.

First, run CONVPDR to convert the FX-80 driver file to a text (.DOC) file, and then edit the file, using Word or another text editor. Toward the bottom of the file you will see a line that reads

```
byte:144 mod:3 magic:0 value:0 "[K"
```

This is the code that Word uses to enable the printer's underline print mode. The key here is that "mod:3" tells Word to use the Epson graphic print mode to do the job. Just change this line to

```
byte:144 mod:1 magic:0 value:0 "[L"
```

Changing the "mod" value to 1 causes Word to use the "backspace mode" for underlining characters. This means the printer will backspace and underline each character with the standard underscore

```
100 ' WSPATCH.BAS -- by Henry Bearman -- colors WS function keys
110 DEFINT A-Z:DIM NA(10,2),TA(10):NA(1,1)=64H4F69:NA(2,1)=64H4F77
120 FOR K=3 TO 10:NA(K,1)=NA(K-1,1)+16:NEXT
130 FOR K=1 TO 10:READ NA(K,2):NEXT:TA(1)=NA(1,1)+2
140 FOR K=2 TO 9:TA(K)=TA(K-1)+16:NEXT:TA(10)=TA(9)+16
150 OPEN "WS.COM" AS #1 LEN=1:FIELD #1,1 AS AT$
160 GET 1,134:IF VAL(AT$)<3 THEN PRINT "Not WordStar version 3.3x!":END
170 SCREEN 0:WIDTH 80:COLOR 3,0:KEY OFF:LOCATE ,0:CLS:US$=STRING$(2,32)
180 PRINT "BLACK--BLUE--GREEN--CYAN--RED--MAGENTA--YELLOW--WHITE"
190 PRINT " 1 2 3 4 5 6 7"
200 LOCATE 5,1:PRINT "Enter color for function key's text:":US$
210 P$=INKEY$:IF P$="" THEN 210 ELSE LOCATE 5,38:PRINT P$
220 IF ASC(P$)<48 OR ASC(P$)>55 THEN BEEP:GOTO 200 ELSE P=VAL(P$)
230 LOCATE 8,1:PRINT "Enter the background color's number:":US$
240 Q$=INKEY$:IF Q$="" THEN 240 ELSE LOCATE 8,38:PRINT Q$
250 IF ASC(Q$)<48 OR ASC(Q$)>55 THEN BEEP:GOTO 230 ELSE Q=VAL(LEFT$(Q$,1))
260 LOCATE 11,1:PRINT "Enter color for function key number:":US$
270 R$=INKEY$:IF R$="" THEN 270 ELSE LOCATE 11,38:PRINT R$
280 IF ASC(R$)<48 OR ASC(R$)>55 THEN BEEP:GOTO 260 ELSE R=VAL(LEFT$(R$,1))
290 LOCATE 14,1:PRINT "Enter color for number's background:":US$
300 S$=INKEY$:IF S$="" THEN 300 ELSE LOCATE 14,38:PRINT S$
310 IF ASC(S$)<48 OR ASC(S$)>55 THEN BEEP:GOTO 290 ELSE S=VAL(LEFT$(S$,1))
320 COLOR R,S:LOCATE 17,1:PRINT "1 ";COLOR P,Q:PRINT "SAMPLE "
330 COLOR 3,0:LOCATE 20,1:PRINT "Is selection okay? (Y/N)"
340 I$=INKEY$:IF I$="" THEN 340 ELSE IF I$="n" OR I$="N" THEN 170
360 FOR K=1 TO 10:AD=NA(K,1)
370 FOR J=1 TO NA(K,2):LSET AT$=CHR$(16*S+R):PUT #1,AD:AD=AD+2:NEXT
380 AD=TA(K):FOR J=1 TO 6:LSET AT$=CHR$(16*Q+P):PUT #1,AD:AD=AD+2
390 NEXT:NEXT:CLOSE:SYSTEM
400 DATA 1,2,2,2,2,2,2,2,2,3
```

Figure 1: WSPATCH.BAS program to color 25th line function key menu of versions of WordStar 3.3 or later.

POWER USER

character (ASCII character 95).

Save the file and run CONVPDR again, this time to convert the .DOC file back again to its original .PRD format (be sure to answer "Y" when CONVPDR asks permission to overwrite the previous file).

Gary Kinsman
Chatsworth, California

Your solution works fine, but there's actually an even better way. Byte 144 in the .PRD file can be set to use the Epson's built-in underscore mode, which produces a smoother underline than does the backspace mode. All you need to do is change the "mod" value to 0, so it uses a standard escape sequence, and put the correct code within quotes. You also have to change the way byte 150 (end underline code) works, since you need to tell Word how to get the Epson to stop underlining. The following two changes will do the job:

```
byte:144 mod:0 magic:0 value:0 "[-"
byte:150 mod:0 magic:0 value:0 "[-"e"
```

You'll find that this method will also speed up your printer, since backspacing, which requires extra characters to be processed by both Word and the printer, is not required.

By the way, you should also study CONVPDR.DOC, which is on the Word Utility disk to find other "tune-ups" you can perform on your .PRD files.

—John Dickinson

Stripping WordStar's High Bits

WordStar users with dBASE II have an easy way to strip the high bits the word processor tacks on to the end of each word in a document. Simply boot up dBASE II and load the WordStar file into dBASE's own editor by typing MODIFY COMMAND (filename.ext). Since dBASE's editor assumes a .PRG extension, you must be sure to add your document's ex-

ension or a period after the filename if there is no extension. Then simply remove the file by hitting Ctrl-W. The resulting new file will be pure ASCII. I've tried this with documents up to 30K bytes in size without problems, though dBASE II will not strip out printer formatting commands, which you must take out separately.

With dBASE III, the process is a bit more complicated. First of all, dBASE III will truncate documents larger than about 4K bytes. Longer documents must be broken up into 4K-byte segments, converted into ASCII, then reassembled using WordStar's nondocument mode. Also, unlike dBASE II, dBASE III won't strip out the high bits unless you actually change the file in some way while in MODIFY COMMAND. One way to get around this is to insert a blank line at the top of the file using Ctrl-N, delete it again with Ctrl-Y, then save the file with Ctrl-W. This converts the actual text into ASCII. However, there's

Build Your own IBM Compatible System

XT Building Tools

MONITOR ADAPTORS

Mono w/a printer port.....	\$99
Color Graphics	\$99
Mono w/printer port.....	\$135
Color Graphics w/p. port.....	\$135
Mono Graphics w/p. port.....	\$175
STB Chautier.....	\$299
Everex EDGE.....	\$299
Persyst 808.....	\$395
Color 400.....	\$400

MULTIFUNCTION BOARDS

AST Six Pak 384K.....	\$299
Quad 384K.....	\$299
384K Generic 6-pack.....	\$195

MISC. ITEMS

Floppy controller.....	\$69
DIC Hard disk controller.....	\$215
Teac 558.....	\$99
Quime 142.....	\$75
135 W Power Supply.....	\$99
XT Mother Board.....	\$250
Turbo Mother Board.....	\$350
Chassis.....	\$99
5150 style Keyboard.....	\$99
5151 style Keyboard.....	\$155
AT style for XT.....	\$135

IBM XT Compatible KIT

\$695

Dual DS-DD 256K 8 Slots 135W Keyboard



PC SOLUTION

ASSEMBLED SYSTEMS
All Systems Include: 8 Slots, 135W Keyboard,
90 Day Warranty! Hard disk systems as below

PC Solution XT

2 DS/DD, 256K.....	\$795
2 DS/DD, 10 Meg.....	\$1295

PC Solution TURBO

2 DS/DD, 256K.....	\$895
2 DS/DD, 10 Meg, 640K.....	\$1495

AT Solution

8086, 256K.....	\$2295
Enhanced, 512K, 20 Meg.....	\$2995

Hard Disks & Controllers

10 Meg Internal.....	\$535
20 Meg Internal.....	\$835
30 Meg Internal.....	\$995
10 Meg External.....	\$699
20 Meg External.....	\$899

MODEMS

Hayes 1200.....	\$399
Hayes 1200B.....	\$315
Everex 1200B.....	\$195

MONITORS

Tatung.....	\$160
Toscan 121.....	\$165
PGS MAX-12E.....	\$185
PGS HX-12.....	\$450
Toscan 425.....	\$425
Toscan 440.....	\$550
Xtron TTL.....	\$125

PRINTERS

Panasonic 1091.....	\$259
Panasonic 1092.....	\$369
Canon PW1080.....	\$299
Citizen MSP-10.....	\$289
Epson FX85.....	Coil
Epson FX185.....	Coil
Toshiba 1340.....	\$549
Toshiba 351.....	\$1295

Hi-Tec Computers & Electronics • (301) 564-9500

10524 Detrick Ave., Kensington, MD 20895

PC Solution is a trade name of Hi-Tec Enterprises, Inc.

Compatibility

To be sure that your hard disk is 100 percent compatible with the IBM XT you don't need to buy the same hard disk that's in the XT. You can't even be sure what brand hard disk it is because IBM, like Express Systems, goes into the marketplace and buys hard disks from several vendors. However, they buy their XT hard disk controller from only one vendor—the same one we do.

You can buy the IBM XT controller from IBM for \$495 or you can buy from us, the functional equivalent, manufactured by the same company that makes it for IBM for only \$195. Is it the exactly identical IBM XT controller? No, it's better. First, it takes less power, and secondly, it can control from 5 to 32 megabytes—the IBM controller can work with only 10 megabytes. It is 100 percent IBM XT compatible, and 100 percent is 100 percent. If you want to save a slot, we carry a version that lets you operate two hard disks and two floppy disk drives.

More than 32 Megabytes

You can operate with more than 32 megabytes (the limit of DOS) through the use of "device drivers." Express Systems can supply you with device drivers for our hard disks for over 32 megabytes formatted. But, if you don't have individual files, or databases that are large, you might want to consider one of our controllers that can divide our 65 megabyte (formatted) hard disk into two equal volumes of 32 megabytes each.

Reliability

We offer you a choice between iron oxide and plated media—the stuff that covers the hard disk and gives it its magnetic properties. Iron oxide is, well, it's rust. If you inadvertently jost your disk, you may cause the low flying head to dig out some iron oxide. A little rust flake can ruin your whole day. Plated media is more resistant to damage, and if it happens, less data is lost.

We offer both types of hard disks. The iron oxide is older

Low power

Complete hard disk kit \$395

Comes complete with virtually the identical controller that's in the IBM® XT, and Xerox® warranties the hard disk for one year

Guaranteed 100 percent IBM PC compatible

How can we offer this fantastic price? Simple. We buy in such volume that even the most avicious hard disk businessmen understand they have to give us the best price possible. We could pocket the difference, but we don't.

Instead, we put the extra profit into our testing facilities. That's why Xerox guarantees our \$395 10 megabyte hard disk for one year.

Xerox knows, as our customers know, that we have an extensive testing program. Here is what we contribute toward giving you the maximum hard disk performance.

Best Drives Available

First, we buy the best drives available. Sounds trite, doesn't it? I mean, a drive's a drive—right? Hardly. You should see some of the junk we get in our labs. Some have such high failure rates that we even questioned our own \$10,000 hard disk tester. But when we tested other manufacturers' drives we were assured that our equipment was fine, which just confirmed that the bad hard disks were not only bad—they were real bad.

But that's just the weeding out process. We then take each drive that we've put through our tester and test it again with the controller you've requested. We call this a "tested pair."

DOS Doesn't Do It

In case you're thinking that all

this is an unnecessary duplication of what DOS does for you, let me explain the disk facts of life.

If DOS did what you may think it is supposed to do when you format the disk, DOS would map around these bad areas. Unfortunately, DOS doesn't do this.

DOS 2.0 and 2.1 can't enter the bad tracks. DOS 3.0 can, but only on the IBM AT. Unfortunately, as the press has so well documented, the AT's hard disk develops bad tracks later on.

We do what DOS can't

We believe the problem is so bad, we use a software program that performs a powerful test of your disk drive on all of the IBM or IBM compatible computers—PCs,XTs, and ATs. Our format takes hours to analyze the disk. But when we finish, you know that the bad tracks are really mapped out so you won't write good data that will disappear into a black hole. We even send you a printed statement of our test results.

Our software allows you to type in the bad track locations from the list supplied by the manufacturers, so you'll never write good data to them—even if DOS didn't identify them as bad. The software even lets you save the location of these bad sections to a file, so that you can reformat your disk without spending hours retesting.

We even include a program that will give you continuous comments on the status of your hard disk. No more waiting for that catastrophic failure.

Average Access Time

As you might suspect, some hard disks are faster than others in their ability to move from one track of data to another. The time it takes the hard disk to move one-half way between the beginning of the disk to the end is called the "average access time."

The first generation of 10 megabyte hard disks had average access times of 80-85 milliseconds (msec). But computer users love speed, and guess what—the average access time for the new 20 megabyte hard disk in the IBM AT is only 40 msec. (We sell an AT equivalent with only 30 msec access time!)

There are some legitimate reasons for the shorter access time. It's particularly helpful when there are multiple users on the same hard disk. It's also important when running a compiler. But remember, before you get too wrapped up in the access speed, there's always that ST 506 interface which won't let data transfer from the hard disk to the computer any faster than 5 megabits/second. We've bypassed that choke hole, too. If you want the functional equivalent of a Ferrari with a turbocharger, order our 10 Mbit per second 100



technology, quite frankly, manufacturers understand it better. Their better understanding, combined with some of the special head locking mechanisms, gives us peace of mind when we sell you one.

Power

Hard disks consume power. Our small, half-high hard disks consume so little power that you can use them with your existing IBM PC power supply. If you plan to use lots of slots, you'll want to increase your power supply to be safe. We offer the same amount of power for your PC that comes in the XT.

Our Customers

Some folks just never feel comfortable buying mail order. They forget that Sears began as a mail order house or that IBM is now into mail order. But, if it helps, here is a *partial* list of customers who have felt comfortable to buy from us.

IBM	Sears
American Express	Honeywell
U.S. Army	MIT
AT&T (Bell Labs)	RCA
Bausch & Lomb	Lockheed
Xerox	Sperry

Easy to Install

If you're like most of us, raised on the boob tube rather than the Great Books, you'd rather see the movie than read the book. Well, now you can choose to read our installation manual or for only \$9.95 more, you can get a VHS or Beta video cassette showing the simple steps for installation.



Our VHS or Beta Cassettes make installation easy.

Warranty

We offer you a one year warranty on our hard disks—the same as IBM on the AT and 90 days on the tape drives. (It's all the manufacturer gives us.) If



Complete Hard Disk Kits

Formatted MB	Height	Plated Media	Average Access	Transfer Rate	PC or PC/XT	AT
10	1/2	no	85 msec	5 Mbits/s	\$ 395	\$ N/A
10	1/2	yes	85 msec	5 Mbits/s	\$ 495	\$ N/A
21	1/2	yes	85 msec	5 Mbits/s	\$ 795	\$ 595
21	Full	no	30 msec	5 Mbits/s	\$ 1,535	\$ 1,340
32	1/2	yes	85 msec	5 Mbits/s	\$ 995	\$ 795
32	Full	no	30 msec	5 Mbits/s	\$ 1,775	\$ 1,575
65	Full	no	30 msec	5 Mbits/s	\$ 2,295	\$ 2,070
100	Full	yes	18 msec	10 Mbits/s	\$ 4,995	\$ 4,995
Removable Hard Disk						
10	1/2	no	90 msec	5 Mbits/s	\$ 1,095	N/A

Tape Systems and Subsystems

Formatted Storage Capacity	Height	Data Transfer Rate (K/sec)	PC or PC/XT	AT
60 Mbytes	1/2	88	\$ 995	\$ 995
60 Mbytes Subsystem		88	\$ 1,295	\$ 1,295
21 Mbytes (unformatted) Start/stop Subsystem		21	\$ 595	\$ 595
26 Mbytes Floppy Tape® Subsystem		31	\$ 749	\$ 749

Controllers

All of our hard disk and tape controllers are available separately. Please call for prices.

Subsystem Chassis

Any of our disk or tape units are available in an external subsystem for an additional \$250.00. You can mix & match any of our 1/2 high hard disks or tape drives together or add any single full height hard disk.

Tape Cartridges

Express Certified 555 foot 301 Hci 1/2-inch Data Cartridge \$35.00

Power Supply

130 Watt Power supply \$75.00*
150 Watt Power supply \$125.00

*with the purchase of any drive

More questions?

Because we spend so much attention on the front end with ensuring that our disks will arrive in working order, we have a customer service department that, unlike many of our competitors, has little to do. When you need us, you won't get a constant busy signal.

Call our friendly, knowledgeable customer service staff to get answers to your questions—before or after the sale. Our people, who know the PC, can talk you through the sticky parts, and they'll respond to you quickly. Just call us.

How to order

Pick up the telephone and call 1-800-341-7549, to order. We accept Master Card, VISA, American Express and Diners Club. Or send a cashier's check or



money order (We'll take a check, but you'll have to wait for it to clear) and tell us if you want one of our recommended configurations or you want to mix and match yourself. Corporations with a DUNS number may send purchase orders for quantities over five.

EXPRESS SYSTEMS

Call Toll Free 1-800-341-7549 Ext. 1200
In Illinois call (312) 882-7733 Ext. 1200

Express Systems, Inc., 1254 Remington, Schaumburg, IL 60195
CIRCLE 383 ON READER SERVICE CARD

IBM





30MB FDC-HEIGHT DRIVE FOR IBM AT
 • Access time is 2 x's faster than any other 1/2 height drive \$795



**NEW ITEM
MEMORY
EXPANSION
CARD**
 • Half-size card
 • Multifunction with 2 serial ports
 CALL



10-45MB 1/4" STREAMING TAPE by WANGTEK
 • Software includes image backup/restore and file by file
 Internal - \$465
 External - \$565



10/20 MB HARD DISK SUBSYSTEM by Microscience

• Half height
 • Low power consumption
 • Controller, software, cables included
 10MB \$489
 20MB \$599



20MB STREAMING TAPE DRIVE by MEMTEC
 • Backup 10MB in under 4 minutes
 • Software included \$625

ALSO AVAILABLE

• Mounting bracket for COMPAQ DESKPRO and IBM AT
 • Data cable
 • V or power cable



300/1200 MODEM

• 100% Hayes Smart Modem and Bell 103/212 compatible
 • Also supports COM 3 and COM 4
 Internal - \$196
 External - \$325



EXPANSION CHASSIS

• Various I/O slots/models to choose
 • Supports all IBM controllers and memory expansion
 \$595 - \$665



10MB TAPE BACKUP

• Uses regular floppy controller
 • External unit also available
 Irwin - \$525
 Interdyne - \$425



COLOR/MONO GRAPHIC DISPLAY CARD

• 720 x 350 resolution in monochrome
 • 640 x 200 resolution in color
 Color/Mono - \$260
 Hercules Compatible Mono - \$255

MEMORY EXPANSION CARD

• Serial, parallel game ports and clock/calendar
 With 64K - \$139
 With 384K - \$179



IBM, AT & T AND COMPAQ ARE REGISTERED TRADEMARKS.

VISA OR MC
 ADD 3%
 TO ALL PRICES



HALF-HEIGHT FLOPPY DRIVE

• 100% IBM compatible
 • 360K byte capacity and 48 TPI \$119



It's Your Move To Improve!

For years we have been selling our products through distributors hoping that they will provide better technical support and services to our customers. Lately, we find that most of them are not really technical and sensitive enough to satisfy our customer needs. In order to provide quality products and services at factory prices, we have decided to sell to you direct by passing distributors. Each of our products comes standard with an easy do-it-yourself installation guide. If you still have problems, our highly trained technical staff is only a phone call away to answer any of your questions.

To further back up our commitment for high quality and better services, our policy is one year warranty and a 30-day no-questions-asked money back guarantee on most of our products.

Remember. No loss. No stalemate. Make your move to improve. Call us at our hotline.

IN USA CALL: 800-JEDEN 85
 IN CALIFORNIA CALL: 800-JEDEN 8A
 For a free catalog, call 714-545-8108
 CIRCLE 160 ON READER SERVICE CARD

JEDEN
 COMPUTER PERIPHERALS

IN CANADA 416-842-3177
 912 Barton Street, East, Suite 26
 Hamilton, Ontario, Canada L8L3C2

16650 Harbor Blvd., Suite C-15
 Fountain Valley, CA 92708

ONE GOOD PC INVESTMENT DESERVES ANOTHER!

PC MAGAZINE!



TESTED APPLICATIONS!

YES! I'd like to subscribe to PC Magazine—
one year (22 issues) for only \$22!
66% off the single copy price!

☐ Payment enclosed ☐ Bill me later

Mr./Mrs./Ms. _____ please print full name _____ PC 45891

Company _____ Title _____

Address _____

City _____ State _____ Zip _____

Add \$15 per year outside USA. U.S. currency only. Regular one-year (22 issues) subscription price is \$34.97. Please allow up to 60 days for delivery of first issue.

Make sure you get the most out of your PC with PC Magazine!

PC brings you hands-on, torture-tested hardware and software reviews and evaluations, new applications to maximize the overall performance of your PC, and powerful user techniques that increase the speed and flexibility of your system!

PC Magazine provides you with the news, information, and ideas that help you make the most out of your investment—22 times a year!

Subscribe today and save 66% off the single copy price of \$2.95!

UNBIASED PRODUCT REVIEWS!

YES! I'd like to subscribe to PC Magazine—
one year (22 issues) for only \$22!
66% off the single copy price!

☐ Payment enclosed ☐ Bill me later



Mr./Mrs./Ms. _____ please print full name _____ PC 45891

Company _____ Title _____

Address _____

City _____ State _____ Zip _____

Add \$15 per year outside USA. U.S. currency only. Regular one-year (22 issues) subscription price is \$34.97. Please allow up to 60 days for delivery of first issue.

A GREAT GIFT FOR A FRIEND OR COLLEAGUE!

Give a friend one year (22 issues) of PC Magazine for only \$22. It's a great way to tell an associate that you're thinking of them 22 times a year!

Send Gift TO: _____ Gift is FROM: _____ PC 45C09

Company _____ Company _____

Address _____ Address _____

City _____ State _____ Zip _____ City _____ State _____ Zip _____

A card will be sent in your name.

☐ Bill Me ☐ Payment Enclosed

☐ Please enter my own subscription to PC Magazine for one year (22 issues) for only \$22.

Add \$15 per year outside USA. U.S. currency only. Regular one-year (22 issues) subscription price is \$34.97. Please allow up to 60 days for delivery of first issue.



To subscribe,

**CALL TOLL-FREE,
1-800-852-5200**

or use one of the attached cards.



NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO. 66 BOULDER, COLORADO

POSTAGE WILL BE PAID BY ADDRESSEE



P.O. Box 2443
Boulder, Colorado 80321



NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO. 66 BOULDER, COLORADO

POSTAGE WILL BE PAID BY ADDRESSEE



P.O. Box 2443
Boulder, Colorado 80321



NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO. 66 BOULDER, COLORADO

POSTAGE WILL BE PAID BY ADDRESSEE



P.O. Box 2443
Boulder, Colorado 80321



GET A GREATER RETURN FROM YOUR PC!

*Because PC Magazine brings
you all of this 22 times a year!*

- Breakthrough product announcements!
- In-depth reviews and product evaluations!
- Professional, hands-on applications!
- Time- and money-saving ways to use your PC!
- User-to-user exchange of ideas and shortcut routines!
- Up-to-the-minute news on the IBM industry!

Subscribe today
one year (22 issues) only \$22.
Save 66%!

**For fast service
CALL TOLL FREE
1-800-852-5200**

FREE with your paid
subscription—
*The Best of The
Norton Chronicles*



still one more step left.

dBASE II's MODIFY COMMAND automatically converts WordStar's "soft" carriage returns into regular (hard) ones, but **dBASE III** will not. To convert the carriage returns, open the document in WordStar's nondocument mode. At the top of the file, type Ctrl-QA (search and replace). At the "FIND?" prompt, hold down the Alt key and type 141 at the numeric keypad, then release the Alt key and hit Enter. At the "REPLACE WITH?" prompt, type Ctrl-P and press the Enter key twice. At the "OPTIONS?" prompt, type NG and hit Enter. This will put a hard carriage return at the end of each line.

Matthew Meighan
Carbondale, Illinois

This tip is handy for converting WordStar files into something legible under DOS's TYPE command and can save you the cost of a conversion utility if you already own and use both programs.

Some dBASE users may be surprised to find that the program's editor can be used with files other than the default .PRG ones. This permits you to modify .FMT, .FRM, and .MEM files, as well as any other ASCII files you wish from within dBASE.—David Obregón

Sending Printer Control Codes

I have read hints both in Power User and elsewhere about sending printer codes to the printer while in DOS. There are several approaches, including BASIC programs, and .COM programs (using DEBUG or the Assembler). I have also seen ads for programs to perform this chore.

But, none of this is necessary! It's a simple matter to send printer control sequences while in DOS itself. All you have to do is use the COPY command to send characters, including control codes, to the printer. Only one real "trick" needs to be used, and that is for sending the Escape character and the ASCII character 0.

All characters, except ASCII 0, can be generated by using the Alt key combined with the numeric keypad. Just hold the Alt key down while typing the desired character's ASCII code on the numeric keypad. Besides ASCII 0, Escape (ASCII 27) also causes problems because DOS has special uses for it (it "escapes" the current com-

mand line as entered so far).

Both difficulties can be solved for Epson (and many other) printers by using the "high order" versions of these two characters. Just add 128 (high-order ASCII 0)

to the character code, and peek away at the numeric keypad. For example, to set an Epson printer into compressed mode with subscripts and small ($1/2$ inch) line heights—a very tiny print size handy for small-size

Printer Boss™

SIMPLY THE WORLD'S BEST PRINTER UTILITY!

The all-new Printer Boss uses machine-level source code to give you superfast operation, command-line input option, dazzling font design features and much, much more. Now you can take full advantage of the capabilities you paid for in your dot-matrix printer on one plain-English menu, at the touch of a few keys. And everything can be controlled from an AUTOEXEC BAT file! No other program gives you all these features.

Custom font design

- Draft mode 8-11 dots/char
- Quad density 16-24 dots/char
- LO-1500 24-9 dots/char
- LO-1500 24-29 dots/char
- LO-1500 24-37 dots/char
- Graphics mode screen display
- Single-key current character test print
- Custom font loading from menu
- Unlimited custom font library

Choice of character sets

- IBM Matrix character set
- IBM Graphics 1 character set
- IBM Graphics 2 character set
- IBM Screen character set
- IBM APL set
- Graphics characters link vertically
- Simulated download: MX, RX, etc.

Supports pathnames

- Configuration, font and print files

Printer format control

- Elite, compressed, enhanced, etc.
- Line spacing
- Right & left margin
- Set form length lines & inches
- Set unidirectional printing
- Set half-speed & proportional printing
- Select 9 Epson language sets

Letter quality graphics printing

- Double density graphics
- Quad density graphics

RAM printer buffer up to 32K

- Buffer on/off control
- Print current buffer control
- Abort current buffer control

Command line printer control

- Autoexec bat file operation
- Unlimited stored settings recall

Unlimited menu setting storage

- Single-key reset to default settings
- Configuration file settings storage

Sideways printing

- Menu selection of 8 font sizes
- Full 256-character fonts
- Sideways font design
- One-per-page spreadsheet output
- Character & line spacing control
- Left margin control
- Top & bottom margin control
- Paper width choice: 6" or 15"
- Doublestrike option
- Printer selection from menu
- Menu printer port selection
- Commands independent of Lotus version
- Spreadsheet page setting constant
- Requires input of # of rows ONLY
- Avoids user calculation of "glueines"

Special features

- Typewriter output mode
- Printer setup string feature
- Custom logo design
- Pop-up printer control feature
- Print direct from word processor
- Supports function keys
- Master select code feature
- Enable Epson NLO option
- Directory default change from menu
- Default change from menu
- Indicates unvariable options
- Single-key sample print routine
- Printer selection from menu
- Mouse software interface
- Help screens
- Single menu, all features

For the IBM PC, PCXT, XT, AT and all compatibles with 128K RAM and one double-sided drive using PC-DOS 2.0, 2.1, 3.0 or equivalent. For the Epson and IBM dot-matrix printers and all compatibles. Printer Boss protected \$139.95, unprotected \$169.95. VISA, MC or send money order or check. Company purchase orders accepted. Shipping \$4.00 per package. COD add \$2.00. Outside USA \$15.00. Dealers welcome. Free info.

CONNECTICUT SOFTWARE SYSTEMS
30 WILSON AVENUE
POWAYTON, CT 06853

INFORMATION

203-838-1844
ORDERS
800-321-0409



Connecticut Software

NEW UPDATE THE MANUAL:

ONLY
\$14.95
EACH



THE
MANUAL
COVERS
ALL THE
PROGRAM'S
COMMANDS,
FUNCTIONS, AND
FEATURES IN
ALPHABETICAL ORDER.

LOTUS 1-2-3 • SYMPHONY
FRAME WORK • @BASE II
MULTIPLAN • WORDSTAR
APPLE WORKS • JAZZ
@BASE III • EXCEL

ALSO AVAILABLE
FROM  BOOKS



FROM
\$14.95
A SERIES
OF HOW TO
BOOKS FOR
BUSINESS
APPLICATIONS

LOTUS 1-2-3 • SYMPHONY
FRAME WORK • MULTIPLAN
WORD • APPLE WORKS
CONSTRUCTION MANAGEMENT
FINANCIAL CALCULATION
SMART SOFTWARE
*ALSO AVAILABLE
BOOK WITH DISKETTE

CALL TOLL FREE

1-800-MANUALS

MIS • 1107 NW 14th • Portland, Oregon 97209
Telephone (503) 222-2399

POWER USER

```
A>copy con: lpt1:
<ALT>155 S <ALT>128 <ALT>15 <ALT>155 3 <ALT>018 F6
A>
```

Figure 2: A way to use DOS to send printer escape codes.

directory listings—just refer to Figure 2. The Alt key combined with 155 (shown as <ALT>155) is the same as Escape (since $128 + 27 = 155$), and Alt combined with 128 is the same as ASCII 0. Ordinary characters are typed where they can be used without trouble. Don't forget to press the F6 key at the end to close off communications between the console and the printer.

Now you can simply use the printer in the mode set. In this case, pressing Ctrl-P to enable simultaneous printing makes it easy to print out a directory listing in tiny print.

Judith R. Epstein
Highland Park, Illinois

This trick works with nearly all Epson-compatible printers I've tried it on, including IBM's models. Be careful to check yours for compatibility, however, since Escape codes can be more troublesome than they first appear.—John Dickinson

Star Words

As the new owner of a Star Micronics SD-10 printer, I was anxious to use its near-letter-quality (NLQ) print mode with *Microsoft Word*. Modifying the printer driver for the Epson FX-80 printer (EPSONFX.PR) using *Word's* Utility disk takes care of things nicely.

Two modifications to the FX-80 driver are required. The first adds a font named NLQ, and the second modifies the control codes for italic characters so that NLQ mode is disabled when italics are used.

Adding a font is easier than it sounds. First, you convert EPSONFX.PR to a .DOC file, which you should call SD10.DOC. Edit the file and the following lines, right after the font description for EliteD (which ends with "JF").

```
{F4
CTP:T0
cPSDs:1
FontSize:24
Wtps:12 12 12 12
```

```
beginmod:1 " "4"
endmod:0 " "5"
FontName:NLQ
JF
```

Be careful not to add any extra spaces, and type in exactly what's listed here.

The other change requires you go farther down in the file and find the control sequence for byte 136, which enables italic printing, and byte 140, which disables it. Modify those two lines to read

```
byte:136 mod:0 " "[11"
byte:140 mod:0 " "[10"
```

Now, when you reconvert SD10.DOC to SD10.PR, you'll be able to use NLQ. Just select NLQ as the font name when you format characters, either directly or when using *Word Style Sheets*.

David McGlasson
Fresno, California

This works well if your SD-10 is set in IBM mode—things operate somewhat differently in "Star" mode. As a rule, printers that emulate others either don't do so completely or add incompatible features, and this is a good case of the latter. Fixing a Word printer driver to compensate is, fortunately, relatively easy. You might want to try creating a Word driver that operates the SD-10 in its native mode. You should get more out of your printer that way. Also, don't forget to add Gary Kinsman's underlining technique to speed things up.—John Dickinson

Share Your Power

Tell the world about your latest technical tips for hardware and software applications through *Power User*, and we'll pay you \$50 for your trouble, plus an extra \$25 if you submit it on a disk. If you send a disk, please be sure to include a printout of your submission in order to ensure against damage. Mail your contributions to *Power User*, PC Magazine, One Park Avenue, New York, NY 10016. ■

STAY AHEAD OF THE GAME WITH THE LOWEST IN TOWN!



TECH TURBO PC/AT \$2399

PRICE INCLUDES:

- 6 TO 8 MHZ 80286 CPU
- 512K
- ONE 1.2 MB FLOPPY DRIVE
- 8 EXPANSION SLOTS
- 195 WATT POWER SUPPLY
- COMPLETE MS DOS, PC DOS, XENIX COMPATIBILITY
- RUNS LOTUS 123, OS/2, FRAMEWORK AND ALL OTHER POPULAR AT SOFTWARE.
- ONE YEAR WARRANTY!!

OPTIONS:

TECH TURBO PC/AT WITH 20MB HARD DISK **\$2825**

TECH TURBO PC/AT WITH 20MB HARD DISK

MONOCHROME MONITOR, HERCULES® COMPATIBLE MONOGRAPHICS CARD **\$2999**

ALSO AVAILABLE WITH TAPE BACKUPS, MODEMS, LARGER HARD DISKS, AND NETWORKING SYSTEMS.



TECH PC/AT \$1999

PRICE INCLUDES:

- 6MHZ 80286 CPU
- 512K
- ONE 1.2 MB FLOPPY DRIVE
- 8 EXPANSION SLOTS
- 195 WATT POWER SUPPLY
- COMPLETE MS DOS, PC DOS, XENIX COMPATIBILITY
- RUNS LOTUS 123, OS/2, FRAMEWORK AND ALL OTHER POPULAR AT SOFTWARE.
- ONE YEAR WARRANTY!!

OPTIONS:

TECH PC/AT WITH 20MB HARD DISK **\$2499**

TECH PC/AT WITH 20MB HARD DISK, MONOCHROME MONITOR, HERCULES® COMPATIBLE MONOGRAPHICS CARD **\$2699**

ALSO AVAILABLE WITH TAPE BACKUPS, MODEMS, LARGER HARD DISKS, AND NETWORKING SYSTEMS.



TECH TURBO PC/XT \$1099

PRICE INCLUDES:

- 4 TO 7 MHZ SOFTWARE SWITCHABLE CPU
- 640K
- TWO 360K OS/2 FLOPPY DISK DRIVES
- 8 EXPANSION SLOTS
- 135 WATT POWER SUPPLY
- ONE YEAR WARRANTY!!

OPTIONS:

TECH TURBO PC/XT WITH 20MB HARD DISK **\$1699**

TECH TURBO PC/XT WITH 20MB HARD DISK, MONOCHROME MONITOR AND HERCULES COMPATIBLE MONOGRAPHICS CARD **\$1950**

ALSO AVAILABLE WITH TAPE BACKUPS, MODEMS, LARGER HARD DISKS, AND NETWORKING SYSTEMS.



TECH PC/XT \$799

PRICE INCLUDES:

- 4.77 MHZ CPU
- 256K
- TWO 360K OS/2 FLOPPY DRIVES
- 8 EXPANSION SLOTS
- 135 WATT POWER SUPPLY
- ONE YEAR WARRANTY!!

OPTIONS:

TECH PC/XT WITH 20MB HARD DISK **\$1449**

TECH PC/XT WITH 20MB HARD DISK, MONOCHROME MONITOR, HERCULES COMPATIBLE MONOGRAPHICS CARD **\$1649**

ALSO AVAILABLE WITH TAPE BACKUPS, MODEMS, LARGER HARD DISKS, AND NETWORKING SYSTEMS.

HI-TEK PGS AVT TAXAN IBM AMDEK HERCULES GENOA PARADISE TEAC TOSHIBA HARDWARE/SOFTWARE
NETWORKING HAYES AST JRAM HI-TEK PGS AVT TAXAN AMDEK HERCULES GENOA PARADISE TEAC TOSHIBA
PLEASE ALLOW ONE WEEK FOR SHIPPING VISA, MASTERCHARGE TELEEX: 272006 Answer Back-TECH FAX: 714/556-8325

TECH PC

TECH PERSONAL COMPUTERS
2131 South Hathaway, Santa Ana, California 92705

714/754-1170

©1985 TECH PC IBM, IBM PC, XT and AT are registered trademarks of International Business Machines Corp. Hercules is a registered trademark of Hercules Computer Technology.

CIRCLE 328 ON READER SERVICE CARD

COMPUTER HUT

COMPARE
OUR
SERVICE & PRICE!

IBM-PC, XT & AT
CALL



Apple IIe & Macintosh ... CALL

Compaq®
Portables, Deskpros. 286 Models ... CALL

ITT
XTRA 2DR, 256K ... \$1395

DISK DRIVES

Tandon TM100-2 DS/DD ... \$109

TEAC FD 55-B Slimline ... \$109

IBM® drives w/logo ... \$129

HARD DISKS/TAPE

ME MAYNARD ELECTRONICS

Hard disks & tape back-ups complete with
cont. & cables.

PCI & XT Series from ... \$825

MaynStream Portable tape backup ... \$1095

MEGA Bernoulli 20 Meg. ... \$2495

ALLOY full line ... CALL

IRWIN tape backups ... CALL

ADD-ON BOARDS

QUADRAM

Quadboard 0K exp. to 384K ... \$199

MicroLazer 64K parallel ... \$229

AST

SixPak Plus 64K ... \$229

I/O min Ser Port & Clock ... \$139

Adventure 128K ... \$399

dea IRMA board ... \$649

ORCHID PCturbo-186 w/128K ... \$625

HERCULES

HiRes Mono Graphics ... \$299

Color Graphics w/par port ... \$165

PARADISE

Modular Graphics ... \$289

5-Pack 0K exp. to 384K ... \$159

PERSYST ... CALL

STB — full line ... CALL

TECMAR

Graphics Master ... \$459

Maestro 128K ... \$399

MODEMS

Hayes®

Smartmodem 1200 ... \$399

Smartmodem 1200B w/smartcom II ... \$359

Smartmodem 2400 ... \$629

NOVATION ... CALL

PRINTERS

EPSON

FX-85, FX-185, LX-80, JX-80, LQ-1500,

DX-10, DX-20, DX-35, HI-80 plotter, HS-80 ink

jet —

BEST DEAL — GUARANTEED

brother

HR-10 ... \$299 HR-15XL ... \$369

HR-25 ... \$569 HR-35 ... \$749

Textwriter 5 ... \$899 M1509 ... CALL

FACIT ... CALL

HEWLETT PACKARD ... CALL

OKIDATA

182, 192, 93, 193, 84, 2410 BEST PRICES

NEC

2050 ... \$699 3550 ... \$1095

8850 ... \$1549 elf 360 ... \$459

Pinwriter P2 ... \$549 P3 ... \$775

TOSHIBA

P351 ... \$1129 P1340 ... \$495

P341 ... \$995

ACCESSORIES ... CALL



SPECIALS

PARADISE SYSTEMS

MODULAR GRAPHICS CARD

Runs all IBM Color graphics

software on IBM Mono &

Color Monitors ... \$245

5-PACK w/0K-expandable to

384K, Ser Port, clock, Ram disk

& print spooler ... \$129

ANY PRODUCT NOT
LISTED? CALL

MONITORS

AMDEK

Video 300G ... \$129 300A ... \$139

Video 310A ... \$169

PGS

HX12 ... \$469 HX12E ... \$559

MAX-12E ... \$179 SR-12 ... \$599



SOFTWARE

WORDPROCESSING

MS Word (IBM) \$239 Word (MAC) ... \$149

Multimate, Advantage, Just Write ... CALL

Volkswriter deluxe ... \$149

WordStar / Prosepack ... \$169/\$299

Wordstar 2000 / 2000+ ... \$249/\$299

Word Perfect ... \$229 PFS: Write ... \$84

DATABASE / SPREADSHEET

Lotus 1-2-3, Symphony, Jazz ... CALL

RBase 5000 ... \$359

dBase II, III, Framework ... store only

Cornerstone ... \$279 Supercal III ... \$199

Multiplan ... \$129 Spreads Auditor ... \$99

BUSINESS / ACCT.

Microsoft Project, Chart ... \$159

Harvard Total Project Mgr ... \$269

PFS: File, Plan, Graph ... \$84

Chart Master ... \$229 Sign Master ... \$179

Diagram Master ... \$199

Evergreen One-Write+ ... \$189

BPI Accounting ... CALL

UTILITIES / COMPILERS

Smencom II (IBM) ... \$99

Smartcom II (MAC) ... \$129

Crosstalk XVI ... \$99 Crosstalk Mark IV \$159

Norton Utilities ... \$59 Sideways ... \$39

Sidekick (NP) ... \$48 Superkey ... \$39

Turbo Pascal ... \$39 T.Pascal w/6807 ... \$64

MICROSOFT Macro Assembler ... \$99

MS Basic ... \$239 MS Fortran ... \$219

LIFEBQAT Lattice C ... \$265

DR! Gem Series ... CALL

OTHER

ATI Training Power Series ... \$49

ATI Skill Builder Series ... \$39

Flight Simulator ... \$39

Copy II PC ... \$35 PC tools ... \$35

AND LOTS MORE

EAST COAST

COMPUTER HUT

OF NEW ENGLAND INC.

101 Elm St. Nashua, NH 03060

(603) 889-7625

For Orders Only — (800) 525 5012

KENTUCKY

COMPUTER HUT

Louisville, KY

CIRCLE 375 ON READER SERVICE CARD

(502) 583-5099

MID-WEST

COMPUTER HUT INC.

524 S. Hunter

Wichita, Kansas 67207

(316) 681-2111

For Orders Only — (800) 572 3333

All products usually in stock for immediate shipment and carry full manufacturers' warranty. Price subject to change — this ad prepared two months in advance. We honor personal checks — allow 20 days to clear. COD up to \$500. Visa, MasterCard add 2%. For shipping & insurance add 2% or \$6.00 min. for small items and \$12. min. for monitors, printers, etc. We accept company checks and P.O.'s from Fortune 1000 Companies. All prices reflect mail order cash discount. In store prices may differ. IBM is a trademark of IBM Corp.

Return authorization and order status call information line

1285



User-to-User

Readers share their favorite tricks for getting the most out of DOS, BASIC, and their systems in general.

DOS Keyboard Macros

Would you like to log into drive C:, change your active subdirectory, then execute a program like 1-2-3—all with one keystroke? The NEWKEYBD.BAS program in Figure 1 creates a file called NEWDOS.KBD that sets this up for me automatically. In addition, I can read the directory on my logged drive by hitting Alt-D and load a print spooler buffer by hitting Alt-B. And I can do much more, all without having to purchase any memory-draining commercial keyboard macro programs such as SuperKey.

Lines 110 to 180 read the DATA at the end of the program and write it to the NEWDOS.KBD file. To create your own macros, just change the DATA statements following line 180.

The structure of the DATA fields at the end of NEWKEYBD.BAS is as follows:

1. The first field specifies the total number of commands you want to assign to a single key.
2. The second field is the number of the key you want to redefine (see table in Figure 2).
3. The third field is the exact text of the

command that you would have ordinarily had to type manually. Each must be inside quotation marks, and each must be separated by a comma.

4. After you're all done, the very last line of DATA must be just a zero (0).

Once you've entered your customized DATA statements, run NEWKEYBD.BAS to create your copy of NEWDOS.KBD. Then, to execute your redefinitions, get into DOS and type

COPY NEWDOS.KBD CON:

I put this command in my AUTOEXEC.BAT file to load the keyboard redefinitions automatically. For this to work properly, you have to have booted your system with a CONFIG.SYS on your disk that includes the line DEVICE=ANSI.SYS. And of course ANSI.SYS must be on your disk as well.

My NEWDOS.KBD has 15 lines, and over 125 actual command text characters. You have to alter the ANSI.SYS file for accommodating more than 128 characters in actual command text.

Narendra B. Sheth
San Diego, California

```
100 ' NEWKEYBD.BAS -- by Narendra B. Sheth
110 OPEN "O", #1, "NEWDOS.KBD"
120 READ HOWMANY:IF HOWMANY=0 THEN CLOSE:END
130 READ KEYNUMBER:KEYNO$=MID$(STR$(KEYNUMBER),2)
140 PRINT #1,CHR$(27)*[8;"KEYNO$";"CHR$(34);
150 FOR I=1 TO HOWMANY:READ TEXT$
160 PRINT #1,TEXT$;CHR$(13);
170 NEXT
180 PRINT #1,CHR$(34)"p";GOTO 120
190 DATA 3,68,"C:", "CD LOTUS", "123"
200 DATA 1,32,"DIR"
210 DATA 1,48,"PRINTSP -LPT1 -BUF32"
220 DATA 0
```

Figure 1: Program to redefine your keyboard using ANSI.SYS. The sample DATA statements in lines 190-210 will make F2 load a copy of 1-2-3 located in a subdirectory called C:\LOTUS; Alt-D do a directory listing; and Alt-B load a print spooler (substitute your own macros and keys). Make sure that your CONFIG.SYS file contains the line DEVICE=ANSI.SYS and that your AUTOEXEC.BAT file contains the line COPY NEWDOS.KBD CON:

MAIL ORDER PC Add-Ons
Call Toll Free
800-628-2828 Ext. 526
(for Orders Only)

HARD DISK

10MB MicroScience	
With Controller.....	\$479
20MB MicroScience	
With Controller.....	\$558
20MB Seagate	
With Controller.....	\$515
20MB Tandon	
With Controller.....	\$520
External 10/20MB.....	\$605/\$710
33MB Drive	
With Controller.....	\$1029

BACK-UP SUB SYSTEMS

10MB Tape Back-up	
Drive.....	\$410
20MB Cassette Back-up	
With Controller.....	\$620
60MB Streaming Tape	
Back-up.....	\$799

Hayes Compatible Modems

300/1200 baud	
Internal.....	\$179
Half-size 300/1200 baud	
Internal.....	\$189

Floppy Drive

360K for PC, XT.....	\$85
360K for AT.....	\$100

Multifunction Card

With 0 RAM.....	\$119
With 384K RAM.....	\$169

Serial Port, Parallel Port,
Game Port, Clock/Calendar

Everex Graphics Edge.....\$275

Everex The Edge.....\$265

Compare our Low Price!!!

You get 30 days money-back
guarantee and full manufacturer's
warranty on any of our products.

Call us Right Now....

ELTECH
RESEARCH (USA), Inc.

318 S. Abel St., Milpitas, Ca 95035

409/942-1280

(for Technical Information)

TURBO PASCAL

PROGRAM GENERATOR

CREATE A FUNCTIONAL PROGRAM IN MINUTES

The GTP Program Development System is a sophisticated, effective package to dramatically improve your productivity. It builds **entire** Turbo Pascal programs automatically. The output is professional quality code.

Fast Just paint the screen, fill-in the blanks & generate. Compile the generated code & run your new program immediately.

Fast Develop a **working** program in as little as thirty minutes. Saves many hours of work.

Complete Builds a whole program, **not** just a screen. You get a data base, edits, retrieval, updating, error handling, Help displays...

Flexible Lots of versatile, built-in features. Use Turbo Pascal to add your own functions to the generated code.

Not Copy-Protected
No Royalty Fee on Gen'ed Code
Tech Support from the Authors
30 Day Money-Back Guarantee

You get GTP, its source code and a 100 page Manual. Plus examples, a Tutorial, a Reference card and a 92 member Procedure library.

Requires:

- * Borland's Turbo Pascal 3.0
- * PC-DOS 2.0 +
- * 96k + IBM PC or compatible

BEST PROGRAMMING AID FOR TURBO PASCAL

AEF

P.O. Box 928

Katy, TX 77492

713/391-8570

\$99.95

(\$74 add
\$6 12 tax)

30 DAY MONEY BACK GUARANTEE

Order by phone with your VISA or MC or send a Check payable to AEF.

*NEC CORDS or Purchase Orders accepted.
Foreign orders add \$10.00. pay in US funds.

USER-TO-USER

F1	59	Alt-F1	104	Shift-F1	84	Ctrl-F1	94	Alt-1	120
F2	60	Alt-F2	105	Shift-F2	85	Ctrl-F2	95	Alt-2	121
F3	61	Alt-F3	106	Shift-F3	86	Ctrl-F3	96	Alt-3	122
F4	62	Alt-F4	107	Shift-F4	87	Ctrl-F4	97	Alt-4	123
F5	63	Alt-F5	108	Shift-F5	88	Ctrl-F5	98	Alt-5	124
F6	64	Alt-F6	109	Shift-F6	89	Ctrl-F6	99	Alt-6	125
F7	65	Alt-F7	110	Shift-F7	90	Ctrl-F7	100	Alt-7	126
F8	66	Alt-F8	111	Shift-F8	91	Ctrl-F8	101	Alt-8	127
F9	67	Alt-F9	112	Shift-F9	92	Ctrl-F9	102	Alt-9	128
F10	68	Alt-F10	113	Shift-F10	93	Ctrl-F10	103	Alt-10	129
Alt-A	30	Alt-H	35	Alt-O	24	Alt-V	47	Ctrl-PrtSc	114
Alt-B	48	Alt-I	23	Alt-P	25	Alt-W	17	Ctrl-Left	115
Alt-C	46	Alt-J	36	Alt-Q	16	Alt-X	45	Ctrl-Right	116
Alt-D	32	Alt-K	37	Alt-R	19	Alt-Y	21	Ctrl-End	117
Alt-E	18	Alt-L	38	Alt-S	31	Alt-Z	44	Ctrl-PgDn	118
Alt-F	33	Alt-M	50	Alt-T	20	Alt-	130	Ctrl-Home	119
Alt-G	34	Alt-N	49	Alt-U	22	Alt+	131	Ctrl-PgUp	132
Home	71	Up	72	PgUp	73	Left	75	Right	77
End	79	Down	80	PgDn	81	Ins	82	Del	83
								Shift-Tab	15

Figure 2: Chart of extended ASCII codes for ANSI keyboard redefinition. Each is normally preceded by a 0, but the NEWKEYBD.BAS program takes care of this in line 140.

The numbers on Mr. Sheth's key chart are the extended ASCII codes for every shifted key on the keyboard. (Actually, they are all preceded by a 0, but NEWKEYBD.BAS takes care of this automatically in line 140.)

You could also reassign the normal, nonshifted keys by removing the 0 and the semicolon in line 140 and creating the appropriate DATA statement. For instance, if you never use the grave accent (the backwords apostrophe key), you could change the NEWKEYBD.BAS program to make this key give you a directory listing by removing the 0; from line 140 and creating a DATA line that said

190 DATA 1,96. "DIR"

since 96 is the decimal ASCII code for the grave accent. If you try this, remember not to mix shifted keys (which need the 0;) with nonshifted keys (which don't need the 0;). And whether you are redefining just one key or several, DATA 0 must be the last line in the program.

Remember also that this won't work unless you type the line COPY NEW-DOS.KBD CON: while in DOS. You can keep several different files of reassigned

keys under different names, but you have to COPY each to CON: when you want to use it.

Finally, if you create your own NEW-DOS.KBD file, remember that you had to have already loaded ANSI.SYS by including the DEVICE=ANSI.SYS line in your CONFIG.SYS file in the root directory of your boot disk, which means you may have to adjust your CONFIG.SYS file and reboot for your keys to be redefined.

Disk Memo Pad

Sometimes it's hard to find what's on a diskette. You can create a small READ.ME file, but adding comments to it normally requires the use of EDLIN or a word processor.

The DD.BAT file in Figure 3 creates a small memo or diskette description file and lets you update it automatically without having to use a word processor. You can copy the small DD.BAT file to all your diskettes and use it to remind yourself what's on the disk—and update the reminder automatically.

After you've entered any information, typing DD will display it. To update the information, just type DD followed by up to

WHEN YOU CARE ENOUGH TO "RUN" THE VERY BEST Say it with a Disk!!!

**COMPUTER
GREETINGS CO.**

P.O. Box 12767
Overland Park, KS 66212



ONLY \$14.95

A special occasion wish on a disk rather than a traditional card! Works on an IBM PC, XT, AT, PC Jr and most IBM compatible computers. Send a special disk to that special computer user on your list.

Each disk comes with a Casino Slot Machine and Casino Blackjack program absolutely FREE!!!

I would like to order the following messages

- _____ Copies Merry Christmas
- _____ Copies Sincere Birthday
- _____ Copies Humorous Birthday
- _____ Copies Sincere Anniversary (no spouse)
- _____ Copies Humorous Anniversary (no spouse)
- _____ Copies Sincere Anniversary (no spouse)
- _____ Copies Humorous Anniversary (no spouse)

For a total of _____ disks

@ \$14.95 each \$ _____

Postage & Handling \$ 1.95

Total Enclosed \$ _____

Send to (please print)

Name _____

Street _____

City _____

State _____

Zip _____

Money Back Guarantee _____

Allow 2-4 weeks for delivery

*IBM trademark of IBM Corp

CIRCLE 522 ON READER SERVICE CARD

KEY TRONIC 5151 TEMPLATES

An Overlay designed for easy access to commands and function controls

\$14.20 each + \$1.80 Ship/Hld
*NC Residents add
4.5% Sales Tax

VISA / MC / CHK / MO

Inquire about Holiday Special



AVAILABLE

Wordperfect 4.0 * Multimate 3.3 *
Lotus 1-2-3 * Volkswriter Deluxe *
Dor 2.0/Basic * dBASE II *
Borland dBase II

Call or write for availability of future templates

INTERSTATE SOFTWARE

P.O. Box 40398

Raleigh, NC 27629

FOR ORDERS ONLY

U.S.A. 1-800-993-2981

FOR NC AND INFORMATION CALL

(919)260-5608

Satisfaction Guaranteed

CIRCLE 494 ON READER SERVICE CARD

SCIENTIFIC CALCULATOR

Now you can have all the power of the HP-11C plus more, right on your PC!

INTRODUCING THE KSH-1 FULL FUNCTION CALCULATOR

The KSH-1 is:

- 20 to 180 times faster than the hand-held. (8087 Version).
- Able to insert results directly into foreground program.
- Graphically presented on screen.
- Able to save/recall programs to disks.
- Operable in hex, binary, octal and decimal modes.

•• Plus many other features!••

4995 either plain or 8087 version
5995 both versions

Add \$3 s/h, Visa, MC, Check, MO
Tenn. add 7.25% sales tax

K SOFTWARE HOUSE

Software, Service, Consulting

Rt. 2 Box 8391

Unionville, TN 37180

(615) 294-5090



CIRCLE 342 ON READER SERVICE CARD

FREE * DELIVERY

**CALL:
1-800-
872-4727**

PC-256K, 1/360K Floppy,
10 MB Hard Disk



COMPAQ

256K, 1/360K Floppy, 10 MB Hard Disk



\$2,260.00

256K, 1/360 Floppy, 10 MB Hard Disk



MONITORS

Amdek 310A	\$169.00
Taxan 121, Green	\$159.00
Taxan 122, Amber	\$165.00
TVM MD-3	
(Amber, Green, RGB)	\$449.00
COMREX CR6700 (RGB)	\$299.00

DISK DRIVES

INTERNAL HARD DISK (with controller)	
10MB Rodime (Compaq Upgrade Kit)	\$529.00
10MB 1/2 Height Seagate	\$395.00
20MB 1/2 Height Seagate	\$495.00
External Case	\$149.00

FLOPPY DISK DRIVES

1/2 Height Mitsubishi	\$85.00
-----------------------	---------

PC*USA Has It All

- Honesty
- Price
- Service
- Delivery

TELEPHONE SALES ONLY NOT OPEN TO THE PUBLIC • MINIMUM ORDER \$200.00 for free delivery • TERMS: VISA, MASTERCARD, CASHIER'S CHECK, WIRE TRANSFER (C.O.D. not for orders) • ALL ITEMS SUBJECT TO AVAILABILITY AND PRICE CHANGE • ALL PRODUCTS ARE NEW AND CARRY MFG. AND/OR PC*USA WARRANTY • PLEASE CALL FOR WORK-ORDER NUMBER BEFORE RETURNING DEFECTIVE MERCHANDISE • UNAUTHORIZED RETURNS SUBJECT TO A RESTOCKING FEE • ALL SALES ARE FINAL

CIRCLE 374 ON READER SERVICE CARD

COMPAQ

Portable Hard Disk System
256K 1/360K Floppy, 10 MB Hard Disk



\$2318.00



\$4359.00



Monitor Extra

Systems Include

IBM AT and Keyboard, IBM 1.2 Meg Floppy, Panasonic 360K Floppy, Seagate (ST4028) 20 MB Hard Disk (40 MS Access Time)

TEAC 20MB Tape Backup **\$839**

PRINTERS

EPSON LX 80	\$215.00	COMREX CRIV	\$499.00
EPSON LQ 1500	\$320.00	OkiData 192P	\$369.00
COMREX CR11	\$299.00	OkiData 193P	\$499.00
CANON LASER BEAM			\$2495.00

USER-TO-USER

```
echo off
if z==z%1 goto display
echo %1 %2 %3 %4 %5 %6 %7 %8 %9 >> %0.doc
:display
cls
if not exist dd.doc goto :oops
type %0.doc
goto end
:oops
echo "GYou haven't entered anything yet . . .
echo To enter data, type DD and then type
echo up to 9 words on each line.
echo You can enter up to 23 lines.
echo -----
echo To see what you've typed, just type DD
:rend
```

Figure 3: DD.BAT batch file to create and update memos and other disk directory information automatically. The "G" in the seventh line from the bottom is a beep. You can enter this in WordStar by typing Ctrl-P Ctrl-G.

nine words of text. The next time you type DD the new message will appear, appended to the old.

Steven C. Gilbert
Avon, New York

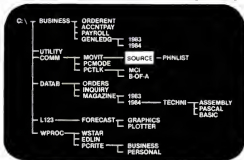
We added several lines to the DD.BAT file to warn users who typed DD to display the message but hadn't yet entered anything. The nice thing about this is that you can leave memos to yourself up to 23 lines long and update the memos without having to load a word processor.

We also added a beep in the warning, which shows up on-screen as a "G". Get into WordStar and type Ctrl-P Ctrl-G to add the beep to your file.

Hitting the Breaks

While BASIC doesn't provide a documented way to disable Ctrl-Break, it's easy to do. The BREAK.BAS program in

DIREC-TREE III® — the experts' choice for managing your Hard Disk.



You construct and organize your hard disk directories.

Here's what reviewers said about DIREC-TREE III:

"Before I used it, I thought my directories were well organized. . . To be honest, I am surprised to find myself liking and using DIREC-TREE."

—Timothy Berry, *Business Software*, 8/85.

"Helps enormously in waltzing through directory trees."

—Peter Norton, *PC Magazine*, 8/20/85.

"None of the utilities I've seen to date come close to a program called Direc-Tree."

—Gary Ray, *PC Week*, 10/23/84.

"... a standout" shell program.

—Alan Hoenig, *PC World*, 8/85.

Whether you're an expert or a beginner, you'll like the ways that DIREC-TREE III helps you organize and operate your hard disk. You'll be able to see and organize all of your directories on a simple tree format which you construct. The arrow keys highlight any directory and a simple keystroke lets you run, create, copy, remove and rename parts of your "tree" to suit your needs. Moving files between directories or disks is also a snap.

A feature of DIREC-TREE III lets you view, or even edit a text file (like a letter) by simply pointing to it and pressing a key. Reviewers also rave about DIREC-TREE III's ability to set up macro commands and run up to 100 programs from one's own menu. Run DOS functions and run programs, too. Print. And locate missing files anywhere, quickly.

Take a tip from the experts and thousands of satisfied users. Get DIREC-TREE III. It's the best hard disk manager your money can buy. "Worth the price," says *PC World*, 8/85. Money back if not completely satisfied.

Version 3.0 operates with IBM® PC, XT™, or AT™ (or true compatibles) using monochrome or graphics board/display. Requires PC DOS or MS DOS version 2.0 or higher — 128K RAM. Operates on any IBM® compatible printer.

Only \$49.50, plus \$5.00 shipping/handling.
California residents add tax.



TO ORDER CALL (213) 377-1640



MICRO-Z COMPANY
4 Santa Bella Rd.

P.O. Box 2426, Rolling Hills, CA 90274
Dealer inquiries welcomed

CIRCLE 534 ON READER SERVICE CARD

Figure 4 first disables Ctrl-Break in line 190 and then re-enables it in line 210. To use this trick in your own programs, you need to follow four steps: (1) Set the segment to 0 with DEF SEG=0. (2) Read the four existing Ctrl-Break address bytes at locations 108 to 111 (&H6C through &HCF) into an array called OLD()—these first two steps are done in line 120. (3) POKE the four values in line 190 into the old address bytes. (4) Reset the segment with DEF SEG.

To re-enable Ctrl-Break after disabling it, GOSUB to the exact routine in lines 210 to 220.

Richard F. Keeler
Rio Piedras, Puerto Rico

This works by changing the interrupt vector (address) at the bottom of memory to avoid executing the internal Ctrl-Break routine and then restoring it later. It and

```
100 ' BREAK.BAS -- by Richard F. Keeler -- adapted by PC
110 SCREEN 0:WIDTH 80:KEY OFF:LOCATE ,,0:CLS:DEFINT A-Z
120 DEF SEG=0:FOR I=108 TO 111:OLD(I-108)=PEEK(I):NEXT I
130 PRINT "Bit '1' to disable Ctrl-Break, '2' to enable it"
140 IS=INKEY$:IF IS="" OR INSTR("12",IS)=0 THEN 140
150 PRINT:ON VAL(IS) GOSUB 190,210
160 PRINT "Now hit Ctrl-Break and watch what happens..."
170 IF IS="1" THEN PRINT " (Or hit Esc for the main menu)"
180 IF INKEY$=CHR$(27) THEN PRINT:GOTO 130 ELSE 180
190 POKE 108,83:POKE 109,255:POKE 110,0:POKE 111,240
200 DEF SEG:RETURN
210 DEF SEG=0:FOR I=108 TO 111:POKE I,OLD(I-108):NEXT I
220 DEF SEG:RETURN
```

Figure 4: Program to demonstrate disabling and re-enabling of Ctrl-Break in BASIC.

many other low-memory manipulations were mentioned briefly in PC Magazine's two-part compendium of PEEKs and POKEs by David I. Scheider (see PC Magazine, Volume 4 Issues 23 and 24). We enhanced the original program to demonstrate the trick more convincingly. Be careful in experimenting with this: if you

disable Ctrl-Break and then enter an endless loop without giving yourself an escape route, you'll have to do a hard reset. So make sure you SAVE any variations before running them. For a complete list of interrupts, look in the Technical Reference manual under "Low Memory Maps" or "Interrupts" (depending on your manual

WE RENT & LEASE MICROS

IBM PC; XT; AT

RENTAL PAYMENTS
APPLIED TO PURCHASE



AT&T 6300; 7300 •

Compaq Dual; Plus; 286

- Software Rentals • Sony 25" Video
- Installation and delivery
- Low yearly, monthly and weekly rental rates

Immediate Delivery!

609-662-1010

Phila., PA (215) 751-9619

NY, NY (212) 477-2555

D.C. (202) 488-4842

We rent modems, HP plotters, HP laser jet, dot matrix and letter quality printers.

National

MICRORENTALS

Inc.

Visa, MasterCard and American Express accepted

New dimensions in Bible study.



THE WORD processor

The KJV or NIV Bible on disks. Search for any word or phrase, create personal indexes, print any verse. Build your own library of Scripture references. \$199.95

THE GREEK transliterator

Start with any English word and find the original Greek, with definition and word roots. For any Greek word find every translation. Includes STRONG'S CONCORDANCE and the KJV New Testament. (Apple and IBM only) \$199.95. Include \$3 postage/handling.

"Software for personal Bible study"
Bible Research Systems

For Apple, IBM PC,
Commodore 64, TRS80,
Kaypro, CPM 2.2, MS-DOS.

2013 Wells Branch Parkway, Suite 304
Austin, Texas 78728
(512) 251-7541

Brand New From Peter Norton A PROGRAMMER'S EDITOR

only
\$50

that's *lightning fast* with the *hot*
features programmers need

Direct from the
man who gave you
The Norton Utilities,
Inside the IBM PC,
and the *Peter Norton*
Programmer's Guide.

THE NORTON EDITOR



"This is the program-
mer's editor that I wished
I'd had when I wrote my
Norton Utilities. You can
program your way to
glory with *The Norton*
Editor."

Peter Norton



*Easily customized, and saved
Split-screen editing
A wonderful condensed/outline display
Great for assembler, Pascal and C*

Peter Norton, 2210 Wilshire Blvd., #186
Santa Monica, CA 90403, 213-826-8032
Visa, MasterCard and phone orders welcome

CIRCLE 346 ON READER SERVICE CARD

USER-TO-USER

version.) Or you can run the following
short program to show you the interrupts
and their addresses (but not their func-
tions):

```
100 ' Displays Interrupts
110 DEF SEG=0
120 FOR A=0 TO 156 STEP 4
130 PRINT "INT 4H";HEX$(A/4);
140 FOR B=0 TO 3
150 PRINT PEEK(A+B);
160 NEXT B:PRINT
170 IF A<84 THEN 200
180 PRINT "(Bit any key)"
190 WHILE INKEY$="" :WEND
200 NEXT
```

Batch Tricks

With DOS 2.1 it's simple to create blank
lines in batch files, by typing ECHO and
following it with two spaces. However, in
DOS 3.1, this trick won't work. DOS will
interpret an ECHO followed by blanks as a
request for the current ECHO status, and
since most users turn ECHO OFF in the
first line of a batch file, all you'll get is an
"ECHO is off" message.

If you create your batch files using the
DOS COPY CON: command, the way to
get around this and end up with a blank line
in DOS 3.1 is to type in the word ECHO
and then hold down the space bar until the
cursor wraps to the next line. When the
cursor moves down to the next line, type
your message.

Another batch file problem is that it's
handy when writing instructions for nov-
ices to refer to the Enter key by actually
drawing on-screen the crooked arrow that
IBM put on the Enter key. You can assem-
ble a representation of this crooked arrow
by printing characters 17, 196, 196, and
217. To see this, run the simple BASIC
program

```
10 PRINT CHR$(17);
20 PRINT STRING$(2,196);
30 PRINT CHR$(217)
```

However, while DOS allows you to
print virtually any of the 256 possible char-
acters on the screen by hitting down the
Alt key, typing in the ASCII number of the
character on the number pad, and then re-
leasing the arrow key, it can't handle char-
acters with ASCII values lower than 32.

One way to create an arrow is to first
load BASICA, type in a line number, a

DOUBLE THE OPTION CAPACITY OF YOUR IBM PERSONAL COMPUTER PC-XTRA

- DIRECT EXTENSION OF PC BUS
- NO SOFTWARE CHANGES
- NO HARDWARE MODIFICATION
- STYLING CONSISTENT WITH IBM

Add all these special options you've been wanting
without worrying about filing plug-in and
back panel space.



DEALER INQUIRIES INVITED.

\$549.00* F.O.B. SANTA ANA
*CALIFORNIA RESIDENTS ADD 8% SALES TAX

PC HORIZONS, INC.
1701 E. Edinger
Suite A6,
Santa Ana, CA 92705
(714) 953-5396

CIRCLE 394 ON READER SERVICE CARD

IBM PC AT USERS NEED



the
286 *TURBOSWITCH

- 33% FASTER
Runs at 8 MHz
- 100% COMPATIBLE
Switches to original 6 MHz

You would expect to pay more—
Megahertz offers these features
for ninety-nine dollars

MHz

We have the technology

MEGAHERTZ Corporation
P.O. Box 1289
Salt Lake City, UT 84110-1289
(801) 535-4374

CIRCLE 389 ON READER SERVICE CARD

space, the "remark" statement REM, and a space. Then use the Alt plus number pad trick with 17, 196, 196, and 217. Save the file as ARROW.BAS. Then load your word processor and delete the line number and the REM statement, leaving just the arrow itself. If you use WordStar, the arrow will appear as "QDDY", but it will resemble an arrow once you're back in DOS. Then you can insert this pictorial arrow into any batch file instead of having to say "Hit the <Enter> key."

David Pincus
San Diego, California

Two interesting approaches to two nagging problems. Both certainly have their merits, but both are in some respects flawed. While the first technique does work, you have to add several extra spaces at the beginning of your message on the second line to compensate for the space taken up by the word "ECHO," or else this message will start at the end of the first line. Also, the DOS COPY CON: trick can handle only 127 characters, which limits the kinds of messages you can write.

A better way to end up with a blank line in DOS 3.1 is to type ECHO, follow it with one or two spaces, and then follow the spaces immediately with a CHR\$(255), which you can produce by holding down the Alt key, typing 255 on the number pad (not the top row!), and then releasing the Alt key. The ECHO + space + space + CHR\$(255) blank line trick works in DOS 3.1; who knows what Microsoft and IBM will do with future versions?

I can think of at least two easier ways to do this. One is to write a small BASIC file that says

```
10 OPEN "ARROW." FOR OUTPUT AS #1
20 PRINT #1, CHR$(17);
30 PRINT #1, STRING$(2,196);
40 PRINT #1, CHR$(217)
50 CLOSE
```

Another even simpler way is to put DEB-UG on your disk and type

```
debug
n arrow
e 100 11 c4 c4 d9
rcx
4
w
q
```

Share Your Discoveries

Tell the world about your latest discovery through User-to-User, and we'll pay you \$50, plus an extra \$25 if you submit it on a disk.

If you send a disk, please include a printout to ensure against damage in transit. Mail your contributions to User-to-User, PC Magazine, One Park Avenue, New York, NY 10016.



Instead of this...



...you can have this



\$14.95

Why waste time digging through cumbersome manuals for operating commands? PC-DocMate™ templates put computer commands at your fingertips for the IBM® PC, PC-XT, PC-AT, Compaq®, and Apple® IIe.

You'll have quick reference for needed commands, options and formats right on your key-board with a PC-DocMate template.

Our professionally designed, two-sided templates are made of durable, non-glare plastic. Satisfaction is guaranteed—fully—or your money back.

Templates Now Available—
IBM PC/XT and COMPAQ:
DOS/BASIC (2.0 & 2.1) • 1-2-3 •
Symphony • dBASE II • dBASE
III • Framework • MultiMate •
WordStar • WordStar 2000 • •
EasyWriter II • MULTPLAN •
PeachText 5000 • SUPER
CALC • TURBO Pascal • Word
Perfect • VOLKSWRITER
DELUXE • Do-It-Yourself.

PC/AT, DOS/BASIC (3.0 & 3.1) •
dBASE III • 1-2-3 • WordStar
2000 • • Symphony • Word-
Perfect • MultiMate.

Apple IIe: AppleWriter II •
WordStar • VisiCalc • dBASE
II • Quickfile • Do-It-Yourself.

How to Order
To order by credit card call toll free
1-800-762-7874
(In NC call 400-878-9001)

Or use the order form below and enclose your personal check, money order or MasterCard/VISA information.

NC residents include 4% sales tax. Please add \$1.50 for shipping and handling per order. Foreign orders, except Canada, add \$15.00 per order! U.S. funds only. No CODs.

Our Guarantee: Use your template for 30 days. If you are not completely satisfied return it to us (undamaged) for a full refund.

System Management Associates

System Management Associates
3525 Executive Drive, Dept. 8-11
Raleigh, North Carolina 27609

Please send _____ (Quantity and format) _____ templates to.

Name _____

Address _____

City _____ State _____ ZIP _____

(_____) MasterCard Card No. _____ Exp. Date _____

(_____) Visa Signature _____

WOULD YOU BUY A PACEMAKER FROM MATTTEL?

IBM/PC-based LOGIC LINE-1™ artificial intelligence software is so advanced, that competitive products are toys by comparison.

There aren't very many who'd stake their lives on a toy-store pacemaker. Luckily, we won't have to worry about their randal cells polluting mankind's gene pool very long anyhow. Such brain-damaged geeks tend to die young.

If you've recently spent money on artificial intelligence software, you might be wishing a few programmers had croaked before writing that blithering swill they named AI and palmed off onto you. What they call an "inference engine" is nothing more than an IF-THEN decision tree that can't even do a very good job of arithmetic!

We're Clarity Software, and we're introducing a product that can take a massive amount of text from any machine-readable source, and mathematically distill thought processes for query and analysis. This process, as distinguished from *expert systems*, is referred to as *natural-language intelligence*.

In this ad, we're going to explain to you why you'd be crazy not to have our package in your portfolio of data-manipulation assets.

DERIVE THE DNA/RNA OF ANY WRITER'S THOUGHT PROCESSES.

LOGIC LINE-1 was the result of the interaction between a couple of cyberneticists and a physicist, with combined experience in high-performance learning and pattern-recognition programming. The physicist was responsible for one of the first DNA/RNA-tracking systems (the *RNA-of-thought* assertion is more than just an advertising conceit). We are not your ordinary bunch of yahoos.

Imagine having the collected thoughts of Voltaire online. If you were interested in viewing Voltaire's thoughts on "job security," you would enter that term in the search menu.

Now you're thinking: "Nuts! These yahoos are trying to sell me something my supposedly *toy* text editor can do with a search command. Right?"

Wrong, pussycat. Your inference process was a little quirk on the trigger. Never, in any of Voltaire's writing, was there ever the phrase "job security."

"Ok," you reply. "You have a dictionary of synonyms, eh?" Wrong again. LOGIC LINE-1 has no dictionary. Interesting?

Essentially, LOGIC LINE-1 uses a series of mathematical transformations on text, the out-

put of which is cataloged in a database analogous to a biological DNA/RNA imprint of that text.

There are approximately one dozen parameters that make up a *thought's* DNA/RNA. Some transformations fingerprint syntax patterns; some look at subject/predicate relationships via a small dictionary of several dozen *noise* words.

After setting up the above Voltaire "job security" query, LOGIC LINE-1 will present you with high-possibility "hits." You will type "Y" when they are relevant, and "S" for skip, when they are not.

The first several "hits" might be rejected, since the term "job security" will not be found. Once you get an acceptable entry, however, and lock onto an acceptable *RNA-of-thought* pattern, the accuracy of LOGIC LINE-1 will be staggering. Or we'll refund your money. Simple enough?

"I'M NOT INTO VOLTAIRE; YOU SAY. WHY DO I NEED LOGIC LINE-1?"

How would you like to be able to turn any textbase into an expert system? For example, most PC users rely upon word processing. The problem is, we store our correspondence in files with names like "LT062185" or "REJECT21" or "RANDOMTH." As a result, we reinvent the wheel with each letter we compose. Why do this?

Using LOGIC LINE-1, you can append all your written correspondence into one textbase file. Sure, any word processor could do a straight search for a term like "quality." But none can do this search as fast as LOGIC LINE-1. And none could turn up the "quality" references if queried for the term "workmanship!"

Thus, when writing letters and speeches, use LOGIC LINE-1 to collect previously articulated thoughts on any given subject. Whatever your profession, be it law, medicine, engineering or information management, LOGIC LINE-1 is an indispensable tool for true thought processing.

Now that thousands of textbases are publicly available, LOGIC LINE-1 is the key to their intelligent use. Once the computer establishes associative links in a large body of material, many creative applications are possible.

TRUE AI! CLONE THE GREAT MINDS ON YOUR PC.

Did Bacon write Shakespeare? Did Albert Einstein have anything relevant to say on the subject of "generation gap?" How many congressmen consistently contradict themselves in the *Congressional Record*?

The uses of LOGIC LINE-1 are limited only by the availability of textbases, and by your imagination.

Do you dare send a student to college without LOGIC LINE-1 and a PC? Would YOU care to compete in business with someone else who has this leading-edge, decision-support software?

Einstein should write your papers on relativity. Alfred North Whitehead should write your papers on philosophy. And Shakespeare should write your love letters.

1985'S SPECIAL \$100 LIMITED-TIME OFFER WILL BE HISTORY IN 1986.

This is our very first, and only, announcement. For the rest of this year, you may obtain LOGIC LINE-1 for only \$100 (note, we didn't try to fool you with a \$99.95 price tag; we do give you, as well as your computer, some credit for intelligence). As of January 1, 1986, LOGIC LINE-1 will retail for \$250.

To find out more about LOGIC LINE-1, call 216/729-1132. You may order by phone by calling 800/621-5839 (or in Illinois, call 800/972-5855). Return the product for any reason whatsoever within 30 days for a full refund. If you are with the US government or one of the intelligence *spook shops*, LOGIC LINE-1 is available to federal/DOD buyers through IBIS Corporation, 131 Elden Street, Herndon, VA 22070, (call 800/532-3344 or 703/478-0300).

You COULD spend your next \$100 for other software. You could also ask Weird Al Yankovic to install that terrific new pacemaker from your kids' *Young Doctor* toy kit. Call today and save more than just money.

CLARITY SOFTWARE®

A Div. of EXPANSION PGMS INT'L, Inc.
PO BOX 839 • Chesterland, OH 44025 • USA
(216)729-1132

*The only other package out there worthy of the label "artificial intelligence" is from Teknowledge in Palo Alto, and we don't compete with them. They build "expert systems," while our emphasis is on "natural language" systems. We mention them in passing, because they're one of the few "good guys." Copyright © 1985 by Clarity Software. LOGIC LINE-1 is a trademark of Clarity Software, and requires a 128K IBM PC with at least one diskette drive and runs under MSDOS 2.1 and up. IBM® IBM Corp. MATTTEL™ Mattel. We hope the swell people at Mattel can take a joke. Advertising & PR by TRRA, 808-758-2708.



PC Tutor

PC Tutor answers queries on everything from operating systems to applications to hardware.

Bordering on Madness

Q: When I install ANSI.SYS as a device driver and run COLOR.COM (see *PC Magazine*, User-to-User, Volume 4 Number 14) on my PCjr, using 17 for the screen attribute and 03 for the border, I don't get white characters on a blue background with a cyan border. Instead, I get a blue screen with a black border. When I enter commands from the keyboard or run other DOS programs, they appear as white characters with black reverse video. CLS returns me to a completely black background and white characters.

When I try to get yellow characters on a blue screen using the ANSI.SYS "SGR" sequence in a PROMPT command, I still wind up with a black border.

Any suggestions on modifying COLOR.COM for the PCjr?

Vincent J. Liesenfeld
Norman, Oklahoma

A: Since *COLOR.COM* uses an output port that the PCjr display does not support, it cannot set a border color on the PCjr. In *PC Tutor*, Volume 4 Number 22, I included a program that would set the border on the PCjr as well as on the regular PC color/graphics adapter and display. It won't, however, work with the Enhanced Graphics Adapter, which cannot do borders.

My preference for color control at the DOS command level is to install ANSI.SYS and use the PROMPT command (see *PC Tutor*, Volume 4 Number 20). But you need not run *COLOR.COM* if you have ANSI.SYS installed. ANSI.SYS maintains its own default video color attribute, which starts out as white on black. Until that attribute is changed (as with the PROMPT command), it will display white on black no matter what *COLOR.COM* tries to do.

A real advantage of using the ANSI.SYS

```

DEBUG
-A
:0100 JMP 013E ; Jump to Initialize
:0102 DB 0
:0103 DW 0,0
:0107 STI ; Interrupts On
:0108 PUSH AX ; Save Registers
:0109 PUSH BX
:010A PUSH DS
:010B CS:
:010C MOV BL,[0102] ; Current Border
:0110 IN AL,60 ; Get Scan Code
:0112 CMP AL,33 ; See if < key
:0114 JZ 011E ; Jump if so
:0116 CMP AL,34 ; See if > key
:0118 JNZ 0136 ; Jump if not so
:011A DEC BL ; For > key
:011C JMP 0120 ; And Continue
    
```

(Figure 1 continues)

Figure 1: Use *DEBUG* to create *KBORDER.COM*, a resident program to change the border colors even on the PCjr.

MAGNUM.

COMPUTER INC.

INTRODUCTORY SUGGESTED LIST PRICES

Magnum PC/XT™



Magnum
Is In
Your
Corner

Fast!
4.77 &
8 MHz

KNOCKOUT FEATURES

1. Full IBM PC/XT Software & Hardware Compatibility
2. RAM Expandable to 640K On Motherboard
3. 360K Floppy Disk Drives
4. 135 Watt Power Supply
5. IBM Selectric AT Style Keyboard (84 Keys)
6. 8088-2 CPU, 3 & 4.77 MHz
7. 5 Expansion Slots
8. 2 Serial RS-232C Ports Built-In
9. 1 Parallel Printer Interface Built-In
10. Clock/Calendar Built-In
11. Floppy Disk Controller Built-In
12. Tape Backup Interface Built-In
13. 90 Day Limited Warranty
14. MS-DOS Operating System
15. Complete User Operating Manual
16. Reset Button Switch Built-In
17. 8087-2 Co-Processor (optional)
18. RAMdisk & Printer Spooler

SYSTEMS A, B, C & D

- | | | |
|---|-----------------------------|--------|
| A | 1.260K Floppy Disk Drive | \$995 |
| B | 640K 2 Floppy Disk Drives | \$1195 |
| C | 640K 1 Disk Drive | \$1795 |
| D | Plus 10 or 20 Meg Hard Disk | \$2595 |

Plus System C Above Plus Tape Backup

PC MasterCard™

9 Functions
1 Board

BOARD FEATURES

1. Expandable to 1.5 MB
2. Serial RS-232C Port
3. Parallel Printer Port
4. Clock/Calendar & Battery
5. Game Port
6. Printer Spooler SiliconBullets™ Software
7. RAMdisk SiliconBullets™ Software
8. Bank Switching Development Software
9. SiliconBullets™ Software Also Includes: Printer Swap, Up To 5 Simultaneous Printers Printing and WhatAmIt™

Works Like AST SixPak Or Quadboard

For IBM PC/XT & Compatibles.

- | | |
|---------------------------|-------|
| With Zero RAM Installed | \$169 |
| With 384K RAM Installed | \$199 |
| With 1.5 MB RAM Installed | \$399 |

1 year limited warranty for IBM PC & compatibles.

384K EconoRAM™ \$99

BOARD FEATURES

1. Full 384K Of RAM
2. Printer Spooler Fasttrak™ Software
3. RAMdisk Fasttrak™ Software
4. Short XT Board

For IBM PC/XT & compatibles having 256K of memory already installed, 1 year limited warranty on parts & labor.

Magnum Computer, Inc. Sold At Leading
1290 SW Garden Place Computer Stores Or
Park 217 In Tigard Contact Us Directly
Portland, OR 97223 We Accept Proprietary Orders
503-684-0000 Visa & MasterCard
Magnum, PC MasterCard, EconoRAM, WhatAmIt,
Fasttrak & SiliconBullets are trademarks
or copyrights of Magnum Computer, Inc.
Prices are suggested list prices and subject to
change without notice due to chip price volatility.



**WE'LL MEET OR BEAT
ANY ADVERTISED PRICE
ON SIGMA DESIGNS
COLOR 400 OR
EXPANSION CHASSIS!**



Sigma Color 400 & PC-SR 12

color 400
W/PAINT 400 ... \$459
W/SR-12 \$995
W/TAX 440 ... \$995
PC MOUSE \$110
EXPANSION CHASSIS ... \$695
MINI EXP. CHASSIS \$595

20 MB TAPE BACKUP

20-27MB of backup at a rate of 50mb per minute! Software provided is menu driven with on-line help and allows image or file backup. Includes drive, interface card, one cassette tape, cables, software & Manual.
External units available! **\$695**

RAM-PLUS W/384K

Creative Micro's new multifunction board comes with a par. ser. clk. cal. up to 384K, RAM disk & spooler

\$189

RAM-PLUS w/OKb \$145

MAXIMIZER W/OK \$189
MAXIMIZER AT W/OK . \$295
ONE REEL TAPE \$695
45MB TAPE BACK-UP... \$995
HAYES 1200 Modem... \$385
HAYES 1200B Modem . \$365

Creative Edge

10 MB HARD DISK

Boot DOS 2.0-3.1 directly from your hard disk. Includes drive, controller, cables & manual.
Prices start at **\$495**

HARD DISK	INT.	EXT.
10Mb Half-hgt	495	695
20Mb Half-hgt	625	795
20Mb Full-hgt	795	945
30Mb Full-hgt	1045	1195

Creative Micro

(415) 945-1201 (800) 321-3324

3339 Vincent Rd.,
Pleasant Hill, CA 94523

PC TUTOR

```

:011E INC BL ; For < key
:0120 AND BL,0F ; Only bottom bits
:0123 MOV AH,2 ; Get Shift States
:0125 INT 16 ; through BIOS
:0127 TEST AL,4 ; Check for Ctrl
:0129 JZ 0136 ; Skip if not on
:012B CS:
:012C MOV [0102],BL ; Save New Border
:0130 SUB BH,BH ; Set Registers
:0132 MOV AH,0B ; to set Border
:0134 INT 10 ; through BIOS
:0136 POP DS ; Retrieve Registers
:0137 POP BX
:0138 POP AX
:0139 CS:
:013A JMP FAR [0103] ; Do old Interrupt
:013E MOV AX,3509 ; Get KB Interrupt
:0141 INT 21 ; through DOS
:0143 MOV [0103],BX ; Save offset
:0147 MOV [0105],ES ; and segment
:014B MOV DX,0107 ; New KB Interrupt
:014E MOV AX,2509 ; Set the Interrupt
:0151 INT 21 ; through DOS
:0153 MOV DX,013E ; Last address for
:0156 INT 27 ; resident terminate
:0158
-N KBORDER.COM
-R CX
CX 0000
:0058
-W
Writing 0058 bytes
-Q

```

(Figure 1 ends)

driver is that it will not wipe out the border when you clear the screen with CLS. However, I've found that so many programs reset the video mode (wiping out the border) when they load that I've written a resident program that changes the border color with a couple of keystrokes.

You can create KBORDER.COM using DEBUG (2.0 or later), as shown in Figure 1. You don't have to type in the semicolons and comments; DEBUG will ignore them. Don't run the program while in DEBUG. Quit DEBUG first and then run it. The program will remain resident in memory until you reboot. And it works on the PCjr.

After KBORDER.COM is loaded, you can hold down the Ctrl key and press the < key to step through all the 16 border colors. Ctrl > steps backward through these border colors. It will work within most programs but not those (like XyWrite) that

hog the keyboard interrupt.

If a PC display is in medium-resolution graphics mode, KBORDER changes the background color. In high-resolution mode on a PC (which is normally white on black), KBORDER changes the foreground color. This provides a little variety when working with Microsoft Word or other programs that use high-resolution graphics.

What I really like about KBORDER is the ease of returning the border to the color you like best after it's been clobbered. It's just a matter of typing Ctrl < and Ctrl > quickly in succession.

(Although it's generally easy to write programs that will run on all members of the PC family, certain peculiarities of the PCjr cause problems. In my original KBORDER program, I used the Alt and I key combination and the Alt and J key com-

bination to run through the border colors. This didn't work on the PCjr, however, since those key combinations are used to mimic the vertical bar and tilde keys of the other PCs.)

The CLS (Clear Screen) command works differently depending on whether ANSI.SYS has been loaded or not. Although seemingly a simple command, CLS has the unique distinction of being the only internal DOS command that calls the BIOS directly. All other internal commands use only DOS calls.

CLS has the unique distinction of being the only internal DOS command that calls the BIOS directly. All other internal commands use only DOS calls.

Since the use of a BIOS call from within COMMAND.COM clearly violates the hierarchical structure of DOS, COMMAND.COM tries to avoid having to do so. If ANSI.SYS is loaded, COMMAND.COM executes CLS by simply sending the ANSI.SYS ED (Erase in Display) sequence to the display through DOS. ANSI.SYS intercepts this sequence and colors the whole screen with the last screen attribute. It does nothing to the border.

If standard output has been redirected from the screen to another device (as with the CTTY command) or to a file, COMMAND.COM also avoids using BIOS calls for CLS. For instance, try running the following command:

CLS >CLRSRN

Whether ANSI.SYS is loaded or not, COMMAND.COM will create a file called CLRSRN, which contains the 4-byte ANSI ED sequence for clearing your screen. If you then enter the command

TYPE CLRSRN

your screen will be cleared if you have ANSI.SYS loaded. If not, you'll just see the ANSI sequence displayed on your screen.

Only if COMMAND.COM actually has to clear your display—without the benefit

of ANSI.SYS to do the work—will it make the BIOS calls to set the background to black and wipe out the border. This is a more literal interpretation of "Clear Screen" than most of us would prefer.

Overlay Questions

When using DOS function call 4Bh (EXEC) to load a program overlay, the parameter block pointed to by ES:BX contains two words. The first word is simply

ACCOUNTING FOR MICROS

\$395

Set of Four
\$325 Set of Three
\$465 Set of Five

ACCOUNTING FOR MICROS is a fully integrated accounting program that meets professional standards. They are fast and easy to use, with complete instructions. Our manual shows how to use the program. Includes helpful information on bookkeeping and computers.

GENERAL LEDGER \$325
Allows up to 1,000 accounts & 1,000 transactions/month. Retains annual balances for last year. This year and forecast. Includes Cash Disbursements, Cash Receipts and General Journals. Reports include Balance Sheet, Income Statement, Annual Summaries and Journal Reports.

ACCOUNTS RECEIVABLE \$325
Allows up to 2,500 customers and 1,000 invoices per month. Invoicing cash advances. Inventory Module. Keeps customer names and addresses. Invoice prints on plain paper or on pre-printed form. Statements can be printed at any time.

INVENTORY \$325
Allows up to 4,000 parts. Keeps 2 month history of unit sales as well as year to date. With AR, can be used as point of sale system (prints invoices, handles cash). Reports include Inventory Value and Stock Report, Internal and Customer Price List.

ACCOUNTS PAYABLE \$325
Allows up to 500 vendors and 1,000 invoices/month. Includes bill of material written checks and computer checks on any pre-printed form. Keeps vendor names and addresses.

PAYROLL \$325
Will handle up to 100 employees with eight deductions per employee. Deductions may be determined as fixed dollar amounts or percentages, or referred to a table for automatic look-up. Tax tables are easily entered, or purchased separately. Prints checks and W2s.

SET OF FIVE \$465
SET OF FOUR \$395
SET OF THREE \$325

RUN ON MOST CPN AND MSDOS

Apple II/III IBM PC XT/AT 486 586
Compaq Amiga 486 586
Epson 486 586
Other DOS 2.0+ 586

DEMO DISK
\$18.00

Try all 5 programs above (CL, AR, AP, IN, PR) (Order our DEMO DISK for \$18.00 includes shipping). Condensed version of the programs give you the "feel" of data entry and access. Includes sample reports and instructions. Specify machine.

TMAN \$325
The "Catch-All" program. Files any type of information for quick access. Name or subject oriented with 15 lines of notes per name. Use TMAN as a mailing list, filing system, notebook, etc. Can be used alone or with data from our other programs.

Tr. TMAN DEMO \$18

HOW TO ORDER: Please specify machine and disk format. You can pay by check by Visa or MasterCard (we need your expiration date and card number), or by UPS COD (add \$2.50 COD charge). Our price includes shipping. Minnesota residents, add 5% sales tax. We ship most orders the same day.

or **ORDER BY PHONE: 612-339-2521**

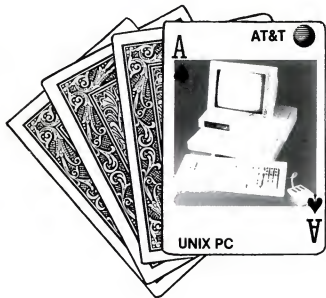
James River Group
INCORPORATED



(612) 339-2521

Dept. PC
125 North First Street
Minneapolis, MN 55401

In this world of High Technology . . .
Don't let your business get lost in the shuffle.



At **CT**,
We deal you an
ACE
. . . Everytime.

- ENHANCEMENTS FOR THE FULL LINE OF AT&T PRODUCTS
- FULL LINE OF COMPUTER PERIPHERALS FOR AT&T AND COMPATIBLES
- BOTH OFF-THE-SHELF AND CUSTOMIZED SOFTWARE PACKAGES TO MEET YOUR NEEDS
- COMPREHENSIVE TRAINING AND SUPPORT
- OFFICE COMPUTER SOLUTIONS
- MASS STORAGE SOLUTIONS
- COMMUNICATIONS SYSTEMS
- DATA AND VOICE COMMUNICATIONS INTEGRATION
- 24-HOUR TECHNICAL SUPPORT AVAILABLE
- ON-SITE SERVICE
- FOR INFORMATION ON OUR MANY OTHER PRODUCTS & SERVICES, PLEASE CALL US

WORLD RENOWNED FOR OUR TECHNICAL EXPERTISE

CONCEPTS IN COMPUTER TECHNOLOGY, INC.
450 EAST KENNEDY BOULEVARD
LAKEWOOD, NEW JERSEY 08701
(201) 370-5000



Complete Accounting Software Including Payroll for \$15 per module

101 Profitable Reasons To Buy MCBS Accounting Software!

General Features

- 1) Menu Driven System
- 2) Integrated or Stand Alone
- 3) Simplified Installation
- 4) Complete Audit Trails
- 5) Data Files can be accessed by Lotus, dBase, etc.*
- 6) Manuals on diskettes, print them on your printer.
- 7) Modules can be purchased separately.
- 8) Accounts and transactions limited only by disk space.

General Ledger

- 9) Supports multiple departments
- 10) Flexible chart of accounts.
- 11) Prints financial statements in flexible, user defined formats.
- 12) Prints Income Statement and
- 17) Balance Sheet by current month, current quarter, and 3 previous quarters.
- 18) Prints Departmental Income
- 23) Statement and Balance Sheet by current month, current quarter, and 3 previous quarters.
- 24) Prints Budget Comparison
- 25) Income Statement and Balance Sheet comparing Actual vs. Budget with variances and ratios.
- 26) Prints Trial Balance and Chart of Accounts
- 28) Prior Period Adjusting Entries do not impact current results.
- 29) Data Entry screen displays beginning, current and ending balances as well as the last 10 entries.
- 30) System allows new accounts to be created during data entry.

Accounts Payable

- 31) Provides for entry, updating and deletion of vendor information.
- 32) Allows entry, editing and posting
- 33) of payables, adjustments, cancellations and prepaids.
- 34) Prints the Open Item & Cash
- 35) Requirements reports.
- 36) Allows partial payments.
- 37) Prints A/P checks
- 38) Prints Check register.
- 39) Prints the A/P distributions to the General Ledger
- 40) Prints the vendor analysis report.
- 41) Interfaces to MCBS' General Ledger or may stand alone.

Accounts Receivable

- 42) Provides for entry, updating and deletion of customer information
- 43) Allows entry, editing and posting of receivables, credit memos, cash payments.
- 44) Allows up to 99 repetitive line items for fast invoicing.
- 45) Prints the open item and aged receivables reports.
- 46) Prints Invoices, Credit Memos
- 48) and Statements.
- 49) Prints Sales Analysis.
- 50) Supports Partial Payments
- 51) Prints Invoice, Payment and Credit Memo Registers.
- 52) Interfaces to MCBS' General Ledger or may stand alone.

Payroll

with State & Local Taxes

- 53) Provides for entry, updating and deletion of employee information.
- 54- Handles hourly, salaried or
- 56) commissioned employees on weekly, biweekly, semi-monthly or monthly pay periods.
- 57) Calculates Federal, State and Local Taxes.
- 58) Allows user to maintain all tax tables.
- 59) Maintains payroll history.
- 60) Calculates the payroll.
- 61) Prints the payroll register, check register and deductions register.
- 62) Prints payroll checks.
- 63) Provides for after-the-fact payroll
- 64- Prints W-2's, 1099's, 941's and
- 67) quarterly earnings reports.

Inventory

with Order Entry & Purchase Orders

- 68) Uses Average Cost
- 69) Provides for Inventory Item entry, updating and deletion.
- 70) Provides for order entry and editing with inventory update during entry.
- 71) Stock and non-stock items.
- 72) Handles purchases, returns, shipments and adjustments.
- 73) Prints invoices, credit memos, picking tickets, purchase orders, price lists and shipping labels.**
- 74) Prints on preprinted forms or plain paper.
- 75) Prints stock status report and purchasing advice report.
- 76) Full back order retention.
- 77) Quarterly, yearly and prior year inventory history.
- 78) Performs book to physical analysis.
- 79) Over 20 management reports
- 99) including extensive Sales Analysis and Lost Sales Report.
- 100- Interfaces to MCBS' General
- 101) Ledger, A/R, A/P or may stand alone.

*Requires A/R & A/P for some functions.

Any Module For \$15 ea.
Or All 5 For \$50 Total

TO ORDER CALL:

1-800-334-0854, Ext. 826

For More Information:
call (713) 444-6269

Accountants ONLY ...

Accountant's Client Write-up System

- 1) Designed for Accountants
- 2) Allows multiple clients on same disk, accessed by client code.
- 3) Allows new accounts or new employees to be entered from data entry screen.
- 4) Supports multiple departments.
- 5) Running balance shown on screen during data entry.
- 6) Payroll entries made from same entry screen as other entries.
- 7) Accumulates all payroll information and prints quarterly payroll reports including 941's
- 8) Prints W-2's and 1099's.
- 9) Produces client bill on a variety of bases.
- 10) Produces more than 12 reports including Changes in Financial Position, Income Statement, Balance Sheet, Detailed General Ledger.
- 11) Includes automatic report printing.

\$150

All programs run on IBM (PCjr/PC/XT/AT), AT&T, EPSON, TANDY (1000/1200/2000), TI, WANG, COMPAQ, CORONA, SANYO, COLUMBIA*, and MS-DOS machines.

Requires 128K Ram, 2 Floppies or Fixed Disk, 80 Column Printer, MS-DOS, PC-DOS 2.0 or later.

*Computer & software names are trademark or registered by their respective manufacturers.

MONEY BACK GUARANTEE!

Service Contract
Telephone consultation - \$50/yr.
Shipping charges \$5.00
Texas Resident add 6 1/4% Tax
COD Charges \$5.00
Payment by Check, MC or VISA

ATTENTION DEALERS!!!! Call or Write Now for the VERY BEST MARGINS (over 50%) in the Industry.



Micro Computer Business Services

12703 Stuebner Airline Houston, TX 77014

Complete Package - G/L, A/P, A/R, P/R, INV	QTY _____	X \$ 50.00 ea = _____
Individual Module - G/L/A/P/O/A/R/O/P/O/INV/O	QTY _____	X \$ 15.00 ea = _____
Accountants' Client Write-up System	QTY _____	X \$150.00 ea = _____
Pay Method Prepaid, Check Enclosed _____	Texas Residents Add 6 1/4% = _____	
MC # _____	Shipping Charges = 5.00	
VISA # _____	If COD add \$5.00 = _____	
Expires _____ Signature _____	TOTAL = _____	
Company Name _____	Contact _____	
Street/Number _____	Phone _____	
City _____ State _____	Zip _____	

the segment address where the overlay is loaded. The second word must contain a "relocation factor to be applied to the image," according to the DOS Technical Reference manual. Just what is a reloca-

tion factor and what is the image?
Robert W. Reeder
Century City, California

The EXEC function call can be used for ex-

ecuting other .COM or .EXE programs (or to run COMMAND.COM itself) or for loading program overlays.

When the program overlay is in .EXE format, DOS must perform a segment relocation fix-up. Since an .EXE program or overlay may have several segments, explicit segment addresses must be present in order for program code in one segment to make calls or jumps to code in another segment or to access data in another segment. Since LINK doesn't know where the segments will eventually reside in memory

The EXEC function call can be used for executing other .COM or .EXE programs or for loading program overlays.

when the program or overlay is run, it creates a header record in the .EXE file that contains a table with all the addresses in the program that contain explicit segment references.

When DOS loads the program or overlay under the EXEC call, it adjusts all the explicit segment addresses by adding to them the starting segment address where the program is actually loaded.

By image the DOS manual means the memory contents of the loaded .EXE overlay file. By relocation factor it means the starting segment to use to make the segment fix-ups.

Thus, for most purposes, the relocation factor in the second word of the parameter will be exactly the same as the loading segment address in the first word of the parameter. The only reason they might be different is if you wanted to load the .EXE overlay file into one area of memory and then shift it to another area in memory before you actually use it. In that case, the relocation factor would be the segment address where you eventually move it.

The PC Tutor solves practical problems and explains points of general interest. To see your questions answered here, drop a line to PC Tutor, PC Magazine, One Park Avenue, New York, NY 10016.



COMPUSTOCK™

\$59

A FUNDAMENTAL
STOCK ANALYSIS
COMPUTER PROGRAM

□ "...the product did more than the authors said it could do... Compustock is more than any investor will need to do fundamental stock analysis."

Wall Street Computer Review, March 1985

YOUR POWERFUL TOOL FOR STOCK ANALYSIS

Projects Earnings and Dividend Growth Rates, Establishes Buy and Sell Screening Criteria, Calculates Total Return for Different Economic Criteria, Measures Financial Health of a Company, Establishes Risk-Return Relationships.

TUTORIAL ▶ The COMPUSTOCK program and manual are designed to be used as a tutorial for those who have not previously invested in stocks. Examples are given in the manual and provided on diskettes so that new investors can get practice in the methods of evaluating real stock situations.

FUNDAMENTAL ANALYSIS ▶ Graphics establishes easily recognized financial trends. Signals indicate areas of strength and weakness in a stock. Flexibility of input allows the user to perform "what if" analyses to determine the effect on a particular stock. **NECESSARY EQUIPMENT** ▶ The program operates on the IBM, AT, XT, PC, PCjr. (with Basic Cartridge), or Compaq with 128 KB Memory and Graphics Board. A printer is desirable but not necessary. The operating system is DOS 2.0 or later. **OPTIONAL DATA BASE** ▶ An optional follow-on subscription service is available with a planned data base of 1500 to 1800 stocks.

COMPREHENSIVE DATA BASE

DISKETTE SERVICE ▶ A monthly or quarterly diskette service with at least 40 stocks. **TOTAL STOCKS** ▶ Data base will ultimately include up to 1800 stocks. **HARD COPY HIGHLIGHTS** ▶ Strengths of particular stocks highlighted in pamphlet. (Compustock Program is required to run Data Base).

SPECIAL DATA BASE OFFER

	Regular Price	This Offer
COMPUSTOCK PROGRAM	\$59.00	\$40.00
1 YEAR DATA BASE	\$209.00	\$149.00
TOTAL	\$268.00	\$189.00*

*Add \$10 for Color. **After Jan. 86 to increase to at least 90 stocks per service.

☐ My payment is enclosed

☐ Please charge to

☐ American Express

☐ VISA

☐ MasterCard

Phone No. 801-298-4578

Mail To: A.S. Gibson & Sons, Inc., P.O. Box 130, Bountiful, Utah 84010

Credit Card No. Exp. Date

Signature

Name (print)

Address

City/State/Zip

Type of Computer

Utah residents add 6% sales tax. Add \$20.00 shipping outside of North America.

Tutorial Diskette

COMPUSTOCK Program

COMPUSTOCK Program and Data Base

COMPUSTOCK Program and 1 Year Data Base

1 Year Data Base

Only Data Base

☐ Color \$10 ☐ Monochrome \$10
☐ Color \$69 ☐ Monochrome \$59
☐ Color \$199 ☐ Monochrome \$169
☐ Color \$99 ☐ Monochrome \$89
☐ \$209
☐ \$70

-Not copy protected
-30 Day money back
guarantee

CIRCLE 242 ON READER SERVICE CARD

PC Reviews in Brief

IBM Drawing Assistant: Graphics for the EGA

BY CHERYL GOLDBERG

This free-form drawing program from IBM gives the novice user a taste of what the Enhanced Graphics Adapter can do—namely, produce high-quality graphics and text as sharp as that which appear on a monochrome screen. When used with a standard graphics adapter, the package allows you to paint on a black background with either white or 1 of 16 colors; monochrome graphics are available with 16 different fill patterns. With the Enhanced Graphics Adapter, however, *Drawing Assistant* lets you paint and draw using 16 colors at a time from a palette of 64 colors. It includes icons that simplify the drawing of lines, circles, ellipses, squares, and rectangles, as well as the creation of text in different fonts and sizes. The program also lets you zoom, copy, design, and use images from an included art library.

Installing *Drawing Assistant* is easy. If you don't have the IBM Graphics Printer or IBM 80 cps Matrix printer, you can configure the program to work with one of 13 supported printers from companies including C. Itoh, Epson, IDS, Okidata, NEC, and Quadjet—or you can install your nonsupported printer. The installation also lets you turn color on or off, select one of five color modes that give you combinations of 2 to 64 colors, or set up the program for use with a fixed disk.

Five pull-down menus—File, Edit, Modes, Tools, and Text—are accessed by hitting the Home key of the cursor pad. The File and Edit menus handle file operations and drawing creation; the Modes menu lets you move, copy, and fill in standard shapes with a color or pattern;

the Tools menu lets you change your paintbrush shape, align text, draw parallel lines, and establish axes within the drawing; and the Text menu gives you four fonts of text in three sizes, which can be set in boldface, underline, or italic.

Twelve icons appear to the left of the drawing screen and are used to access such functions as spray-painting, labeling, scrolling, zooming, and color filling. EGA users also have color indicators located underneath the icons that allow outlines to be drawn in 16 different colors.

For the most part, the program is easy to use. IBM's *Drawing Assistant* does all the basics fairly well, especially with the EGA board. In a few places, however, it can get tricky. For example, the manual claims the Text menu's default settings are immediately accessible once you've selected its icon and moved to the drawing field. In practice, though, you must actually reselect the default settings before moving the cursor, or nothing happens within the drawing field. However, it does not go beyond the



IBM Drawing Assistant's icons, fill patterns, and menu choices.

basic functions of free-form graphics creation and thus will limit an advanced user.

Indeed, the primary benefit of using this program may well be that it is part of IBM's *Assistant* series—based on the PFS series of easy-to-use software—which also includes *Writing Assistant* and *Graphing Assistant*. When used with the other components of this integrated series, you can easily combine drawings, business graphs, and text within a single document. ■

Drawing Assistant IBM Corp.

For information, contact your local IBM product center.
List Price \$169

Requires: 256K RAM, one disk drive, DOS 2.x, graphics monitor, IBM Color/Graphics Adapter or Enhanced Graphics Adapter.

Circle 635 on Reader Service Card

Aprotek Daisy 1120 Printer: Inexpensive, for True Letter Quality

BY M. DAVID STONE

Low-end daisy wheel printers keep getting less expensive and more impressive. The \$353 Aprotek Daisy 1120 is one of the latest examples of this trend. Designed for a maximum paper width of 11 inches, the printer looks for all the world like a full-size, heavy-duty daisy wheel printer that accidentally shrunk in the drier.

This image neatly describes the printer's capabilities as well. You could almost think of the 1120 as an inexpensive version of the Diablo 630. It uses Diablo ribbons, Diablo and Qume printwheels, and, not surprisingly, it's Diablo compatible. This compatibility means that setting up most software to work with this printer consists simply of picking "Diablo 630" from the program's

installation menu.

The Daisy 1120 comes out of the box in more pieces than I normally expect to see. Most daisy wheel printers come completely assembled except for the ribbon and daisy wheel. With the Daisy 1120, the platen and the curved tray that goes under it are packed separately. This might not be a problem, except there are no instructions in the manual for installing these two

Arlington Computer Products gives you the best prices on IBM PCs...

IBM PC

2 Drives, 256K,
Monochrome Monitor **\$1925**

2 Drives, 256K,
Color Monitor **\$2149**

2 Drives, 256K,
10 MB Hard Disk,
Monochrome Monitor **\$2395**

IBM XT

1 Drive, 256K,
10 MB Hard Disk,
Monochrome Monitor **\$2549**

1 Drive, 256K,
10 MB Hard Disk,
Color Monitor **\$2795**

1 Drive, 256K,
20 MB Hard Disk,
Monochrome Monitor **\$2675**

IBM AT

Unenhanced
\$3095

1.2 Floppy
512K, 20 MB Hard Disk,
Monochrome Monitor
\$3995

COMPAQ PORTABLE, 2 Drives, 640K, Clock, ... **\$2125** 1 Drive, 640K, Clock, 10 MB Hard Disk... **\$2549**

...and disk drives too!

IBM	\$ 99
TANDON TM100-2	\$ 99
SHUGART SA455	\$ 79
TEAC FD55B	\$ 84
360K Drive for AT	\$119

10 MB HARD DISKS

from **\$429**
20 MB HARD DISKS from **\$599**

10 MB TAPE BACK UP
\$479

PERIPHERALS

TAXAN MONOCHROME	\$139
HERCULES GRAPHICS	\$289
HERCULES COLOR CARD	\$145
EVEREX THE EDGE	\$249
STB GRAPHICS PLUS II	\$249
TECMAR GRAPHICS MASTER	\$449
TSENG ULTRA PACK	\$499
TSENG ULTRA RAM	\$199
HAYES 1200 MODEM	\$379
HAYES 2400 MODEM	\$615
EVEREX 300/1200 INT. MODEM w/ software	\$229
US ROBOTICS 2400 MODEM	\$449
ORCHID PC TURBO	\$599
AST ADVANTAGE	\$399
AST 5251-11	\$649
64K RAM CHIPS bank of 9	\$ 9
256K RAM CHIPS each	\$ 4
128K RAM CHIPS each	\$ 6

★ISSUE HIGHLIGHTS★

AST 6 PACK w/384K	AT MULTIFUNCTION w/128K expandable to 3MB	HAYES 1200 B w/ software
\$249	\$239	\$339
QUADBOARD w/384K	EVEREX GRAPHICS EDGE	QUADCHROME II COLOR MONITOR by Quadram
\$225	\$259	\$379
APPARAT w/384K memory & clock	EVEREX MINI MAGIC w/384K memory only	PRINCETON HX 12 includes cable
\$145	\$95	\$419

PRINTERS

<u>EPSON</u>	
LX 80	\$219
FX 85	\$325
FX 185	\$459
LQ 1500	\$879
Interface for LQ 1500	\$ 75
<u>OKIDATA</u>	
ML 192	\$359
ML 193	\$499
84 IBM	\$649
<u>SILVER-REED</u>	
EXP 400	\$249
EXP 500	\$289
EXP 550	\$399
EXP 770	\$699

SOFTWARE

LOTUS 123	\$299
SYMPHONY	\$409
WORDSTAR 2000	\$249
WORDSTAR 2000 PLUS	\$299
O BASE III	\$369
FRAMEWORK	\$369
PC MOUSE w/paint brush	\$119
HAYES SMARTCOM II	\$ 95
CROSSTALK	\$109
KEEP TRACK Home Accountant	\$ 39

<u>TOSHIBA</u>	
1340	\$549
P351	\$1025
<u>NEC</u>	
P2	\$499
P3	\$715
2050	\$639
3550	\$1025

CIRCLE 311 ON READER SERVICE CARD

**Arlington
Computer
Products, inc.**

450 E. HIGGINS ROAD
ELK GROVE VILLAGE, IL 60007



FOR ORDERS & SYSTEMS QUOTES:

800-548-5105

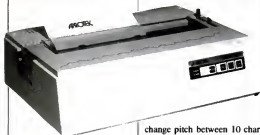
OR
CALL **800-548-5106**

FOR INFORMATION AND IN ILLINOIS CALL 312-228-6333

Prices and Availability Subject To Change Without Notice

pieces. Figuring it out on your own isn't impossible, but if you're not mechanically minded, it may take a while.

tricks worth mentioning. Very much on the plus side is a pressure switch on the front panel that gives you an easy way to



Aside from this oversight, the manual is generally sufficient, if somewhat sparse. A welcome touch is that control codes are easy to find. For those who are new to this game, an appendix gives examples of how to control the codes with IBM BASIC.

The point of having a daisy wheel printer is for its typewriter quality output. I've tested some inexpensive machines that fail miserably on this score, producing broken and uneven text, but the Aprotex fully lives up to its promise. Print quality is as good as anything I've seen elsewhere at any price.

Aside from print quality, speed and noise are important factors in a printer. As you might expect, these are the features that the Daisy 1120 compromises on. I clocked the printer at 20.3 characters per second with the standard PC printer speed test. (Aprotex claims 20 cps). This is slow by dot matrix standards, but not half bad for a fully formed character printer. In fact, 20.3 cps in a true-letter-quality printer that costs this little verges on astounding.

Noise level is a problem. I did not run the standard PC printer noise test, but even without it I can testify that this is one of the noisiest printers I have ever heard. On the whole, I'd rather be listening to a jackhammer pounding just outside my door. But keep in mind that many fully formed character printers have this noise problem—including some of the most expensive representatives of the breed.

The 1120 also has a few nice

change pitch between 10 characters per inch, 12 cpi, 15 cpi, and proportional spacing. Another nice touch is automatic paper loading. Place a sheet of paper at the platen, then pull the

paper bail lever forward, and the paper will automatically load, giving a 1-inch top margin. If you'd rather not bother with manually feeding the paper, you can get either a tractor feed or sheet feeder as an option.

Given its 20.3 cps speed, the Daisy 1120 is clearly not intended for heavy-duty word processing applications. On the other hand, it seems ideal for an office that uses a dot matrix printer for heavy-duty output and needs a letter quality printer to produce five or ten letters a day.

If your printing needs are moderate rather than light, the noise level of the 1120 might be an issue. But given everything this printer has going for it, I'd

be inclined to accept the noise—even if it means investing in a long cable and putting the printer in another room. All things considered, the Aprotex Daisy 1120 has one of the best ratios of price to performance that I've ever seen. At \$353, it's unquestionably a bargain.

Aprotex Daisy 1120 Printer

Apropos Technology

1071-A Avenida Acaso

Camano, CA 93010

(805) 482-3604

List Price: \$353; tractor feed

option, \$77; sheet feed

option, \$188

Circle 637 on Reader Service Card

File Mate: Fast File Manipulation

BY VINCENT PUGLIA

File Mate is a low-cost file management utility with more than one twist. While most file utility programs are content to supply only a better interface to the standard one found in DOS, *File Mate* provides you with several perks that make file maintenance and manipulation easier.

For example, *File Mate* permits you to convert certain text files from one word processor's format to another. It also provides you with a small but effective batch command language and a means of comparing files at different locations on different machines.

Performing operations such as copying and deleting on groups of files requires but one step: You simply call up the desired operation with a wildcard specification. The program then displays each individual file and requests confirmation before proceeding. If you have ever mistakenly erased a group of files, you will appreciate this feature.

One of the program's nicest features is its ability to reformat a word processor's files. The actual procedure involves setting a few toggle switches and then copying the file. Among the options available are insert-

ing and deleting carriage returns and line feeds, stripping *WordStar*'s infamous eighth high-bit, and converting or removing control codes.

After you have converted and copied the file or files, you can view them on-screen in a number of formats. Most users would probably select the ASCII option. However, if you are of a more technical bent, you might be more interested in the hexadecimal, standard dump, or DDT dump options.

Some of the program's other features are especially suitable for people who need to transfer files from one machine to another. For example, one utility allows you to check a file for an end-of-file marker. If this option is active, the utility checks the file in question and inserts the Ctrl-Z if none exists.

The program also includes two different types of file comparison utilities. The first compares two files on disk and reports the first occurrence of a nonmatch. The second program, used for comparing files on different machines at separate locations, is known as a CRC (cyclic redundancy code) check. Virtually each program has a unique CRC value. This feature comes in handy when transmitting or mailing a copy to another site. As long as the

comparison shows equal values as the CRC, the file is intact.

File Mate also simplifies the making, changing, and removing of subdirectories, an ironic feature considering that the program does not display subdirectories when it lists the files on disk. This is the program's major drawback. In order to learn what subdirectories exist on the disk, you have to exit *File Mate* and use DOS. A file maintenance program should buffer you from the operating system, not force you to use it in order to make effective use of the software.

Because of this limitation, I cannot wholeheartedly recommend *File Mate* to users with multiple subdirectories. However, if you are using a two-drive system and are in the habit of transferring files to a different machine or to another word processing system, *File Mate* may make life much easier.

File Mate

Intersecting Concepts

4573 Heatherglan Court

Moorpark, CA 93021

(805) 529-5073

List Price: \$29.95

Requires: 128K RAM, one

disk drive, DOS 1.x or later.

Circle 638 on Reader Service Card

**DISCOUNT MICRO SALES, INC.**

We
Welcome
Corporate
Accounts

*We'll Beat
Any Price!*

*** Free
Shipping**

CALL TOLL FREE 1-800-MICRO SL / 1-800-642-7675

**FEATURED
SPECIALS**

**BORLAND
SIDEKICK
\$29**

**r:BASE 5000
\$379**

**PFS: FILE,
GRAPH, PLAN
OR WRITE
\$82**

**THINK TANK
\$99**

**MODEM:
HAYES
1200B
\$329**

**PRINTER:
PANASONIC
1090-\$199
1091-\$299**

**BOARDS:
HERCULES,
COLOR-\$159
GRAPHICS \$299**

Software

	LIST PRICE	OUR PRICE
ASHTON TATE, dBASE III	695	364
BORLAND INTERNATIONAL		
Sidekick (Protected)	55	29
Sidekick (Non-protected)	85	49
BRODERBUND SOFTWARE		
Bank Street Writer	80	49
BPI SYSTEM		
Job Cost Accounting, Inventory General Acct., AR, AP or PR	595	365
Funk Software, Sideways	60	39
Fox & Geller, Quickcode II or Quickcode III	295	154
gGraph II or gGraph III	295	154
gUtil III	99	59
Harvard Total Project Manager	495	264
SORCIM/IUS, Easy Writer	350	198
GL, AR, AP, OE, Inventory	595	298
LIFETREE, Volkswriter deluxe	295	159
LOTUS, 1-2-3	495	CALL
LOTUS, Jazz	595	375
MECA, Managing Your Money	200	114
MICROPRO, Wordstar 2000	495	255
Wordstar 2000+	595	295
MICROIM, rBASE 5000	700	379
MICROSOFT, Word	375	229
Multiplan	195	119
MICROSTUFF, Crosslink	195	94
MONOGRAM, Dollar & Sense	180	104
MULTIMATE	495	239
PEACHTREE SOFTWARE, all systems	CALL	CALL
PETER NORTON, Utilities	100	58
SOFTWARE ARTS, TK Solver	400	244
SOFTWARE GROUP, Enable	695	369
SOFTWARE PUBLISHING		
PFS: Report	125	74
PFS: File, PFS: Plan, PFS: Graph, or PFS: Write	140	82
PFS: Proof	95	59

Hardware

	LIST PRICE	OUR PRICE
ACCESSORIES		
CH PRODUCTS, Mech III w/Fire Button	55	36
KOALA, Touch Tablet w/Software	150	94
KENNINGTON, Masterpiece	150	94
PC Saver Line Cord w/Filter	50	34
MOUSE SYSTEMS, PC Mouse & Port	220	139
MEMORY CHIPS, CABLES, POWER BACKUPS, CLEANING KITS, COVERS, PAPER, PROTECTORS, FLOPPIES, etc.	CALL	CALL
BOARDS		
AST, Mega Pak (256K)	495	349
AST, Advantage (128K)	595	409
HERCULES, Color	245	159
HERCULES, Graphics	499	299
QUADRAM, Quadboard (256K)	595	349
PARADISE, 5 pack	229	164
TECMAR, Coplan Multifunction (64k)	269	199
COMPUTERS		
IBM, APPLE, COMPAQ others	CALL	CALL
HARD DISKS		
MAYNARD, 20 mb int. w/Cont Roller	1400	894
OMEGA, TALLGRASS, CORVUS, others	CALL	CALL
MODEMS		
HAYES, Smartmodem 1200b	469	354
Smartmodem 1200b (w/Smartcom II)	549	389
Smartmodem 2400	899	629
PROMETHEUS, Promodem 1200b	375	250
Promodem 1200	495	329
MONITORS		
AMDEK, 310a (Amber)	230	149
Color 300	349	244
Princeton Graphics, Taxan, Quadram, etc.	CALL	CALL
PRINTERS		
PANASONIC, P1090	349	209
P1091	399	299
TOSHIBA, P1340 (144cps)	799	619
P351 (288 cps)	1900	1389
EPSON, OKIDATA, NEC, many others ..	CALL	CALL

**Call For Over One
Thousand Additional
Items**

Products listed for IBM PC only. Call for Apple and other Micro Systems.

Low Prices, Fast and Friendly Service.

* Free UPS shipping on all orders over \$700 (printers and monitors may be extra, call for details)

ORDERING INFORMATION AND TERMS:

* Prompt UPS service • No surcharge for credit cards • Visa, Mastercard and American Express orders processed same day • Price guarantee — We'll beat any price in this magazine with same terms — call toll free • Allow 2 to 3 weeks for checks to clear • Full guarantee against manufacturers defects • Prices may change • Authorized purchase orders and C.O.D. accepted

Discount Micro Sales, Inc.
6900 East Indian School Road
Scottsdale, AZ 85251

For Faster Service Call Toll Free
1-800-MICRO SL or 1-800-642-7675
Arizona Resident or for Customer Service Call 714-540-1502

AD#
E12

**Orders Shipped
Within 24 Hours
of Receipt**



New on the Market

DriveCard

PC users wishing to upgrade their systems with a 20-megabyte hard disk drive now have an alternative to the standard full- or half-height drives offered by most manufacturers. Mountain Computer Inc. has announced a complete internal 20-megabyte hard disk mounted on a plug-in card requiring only one and a half slots. The DriveCard's configuration allows the remaining half slot to be occupied by any half-size card currently being manu-

factured. The board integrates a 3 1/2-inch Winchester drive with controller electronics capable of supporting up to two hard disk drives. This permits the card to be installed in such systems as the IBM PC-XT in place of the normal hard disk controller card, effectively operating two hard disks from a single expansion slot connector.

Because of its configuration, the DriveCard does not require ribbon cables, additional power supplies, or a cooling fan. All interfacing between the card and the user's system is accomplished through the single PC connector, enabling the unit to be installed quickly and easily by anyone. Mountain Computer

Inc. has also included hard disk utilities software with the board, adding new functions to the user's DOS. If desired, the board is also available with a 10-megabyte storage capacity.
List Price: 10-megabyte card, \$995; 20-megabyte card, \$1,195
Mountain Computer Inc.
360 El Pueblo Rd.
Scotts Valley, CA 95066
(800) 485-0300
(800) 821-6066

Circle 674 on Reader Service Card



DriveCard,
Mountain Computer Inc.

IBM PC Enhancement Handbook for Scientists and Engineers

This 192-page book is a combination handbook, buyers guide, and technical/specialty products catalog for such applications as computer-aided design, data acquisition, instrument control, engineering development, presentation graphics, scientific word processing, and other areas. The products listed in this guide have been chosen from a range of similar products and are available either as complete turn-key sys-

tems or as separate items. Also included is a range of mass storage and communications products that can be integrated into the primary systems.

List Price: \$18.95
CyberResearch Inc.
5 Science Park Center
P.O. Box 9565
New Haven, CT 06536
(203) 786-5151

Circle 663 on Reader Service Card

PCT-100 Programmable Communications Translator

Users wishing to link their systems with dissimilar equipment are offered a solution in this inline serial RS-232 protocol and data translator by Method Systems Inc. The PCT-100 Programmable Communications Translator may be configured to translate control codes and data sequences bidirectionally, permitting the user to link his system to a variety of equipment or vice versa.

List Price: \$495; technical manual alone, \$25
Method Systems Inc.
3511 Lost Nation Rd.
Willoughby, OH 44094
(216) 942-2100

Circle 659 on Reader Service Card

PCT-100 Communications Translator, Method Systems Inc.



The IBM PC ENHANCEMENT HANDBOOK for SCIENTISTS and ENGINEERS



IBM PC Enhancement Handbook for Scientists and Engineers, CyberResearch Inc.

Special Occasion Stationery

Continuous fanfold stationery in four different color and border designs is being offered by Wizard Computer Accessories Inc. The stationery is made from high-quality textured stock with microperforated edges and can be used with any printer incorporating a tractor-feed mechanism. Two additional paper styles feature holiday motifs.

The stationery is available in gray with blue borders, tan with brown borders, and in tan with one of two background graphics images. It can be ordered in quantities as small as 32 sheets

New on the Market Submissions Guide

All submissions to New on the Market should follow these guidelines:

1. Include the retail price and details of both hardware and software needed for an end user to properly use your new product. This includes required amount of RAM, number and type of drives, operating systems supported, and peripheral equipment needed.
2. Releases should be typewritten double-spaced on one side of the paper. Copies of advertisements may be included, but in most instances we need more information than is typically included in an ad. Include telephone contacts for marketing and technical questions.
3. If available, include black & white glossy photos of the product, 4 by 5 inches or larger.

New on the Market does not review products; do not send sample or demo copies of software. All product announcements are run on a space-available basis, at the exclusive discretion of the editor. Please note that it is impossible to guarantee publication of a product announcement for any particular issue.

If you want
to run software
with graphics on your
monochrome
monitor, we have
some bad news.

As we're sure you've been told, the only way to run software with graphics on a monochrome monitor is to buy a graphics card.

For \$499, the Hercules Graphics Card runs these best-selling programs:

Ashton-Tate, Framework

BPS, Overhead Express

Lotus Development, 1-2-3, Symphony

Microsoft, MicroSoft Flight Simulator, Micro-

Soft Word, MicroSoft Chart

Software Products Int., Open Access

Software Publishing, PFS: Graph

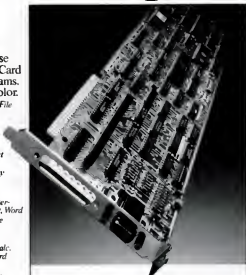
Sorcim, Supercalc 3

In monochrome only.

And some good news.

For \$395, the Paradise Modular Graphics Card runs all these programs. In monochrome. And in color.

Arrays/Continental Software, *Ultra File*
Ashton-Tate, *Framework*
BPS, *Overhead Express*
Brightbill-Robert, *Graphix Partner*
Chang Labs, *GraphPlan*
Dow Jones & Co., *Dow Jones Market Analysis*
Lotus Development, *1-2-3*, *Symphony*
MicroPro, *Chartstar*, *Planstar*
MDBS, *Knowledge Manager*
MicroSoft, *Basic Compiler*, *Basic Interpreter*, *Chart*, *Flight Simulator*, *Project*, *Word*
PC Software of San Diego, *Executive Picture Show*
Prentice-Hall, *ExecuVision*
Schuchardt Software Systems, *Intecal*, *Inseamate*, *Interpret*, *Inteplan*, *Inteword*
Softrend, *Aura*
Software Products Int., *Open Access*
Software Publishing, *PFS:Graph*
Sorcim, *SuperCalc 3*
Summa Software, *Winning On Wall Street*
Trader's Forecast, *Winning On Wall Street*
Trader's Data Manager
Advanced Ideas, *The Game Show*, *Master Match*, *Tic Tac Show*
CBS Software, *Big Bird's Special Delivery*, *Dinosaur Dig*, *Ernie's Magic Shapes*
Davidson & Associates, *Math Blaster!*, *Word Attack!*
Designware, *The Grammar Examiner*, *Math Maze*, *Language Arts*, *Spellcopter*, *States & Traits*, *Trap-a-zoid*
Developmental Learning Materials, *Alien Addition*, *Alligator Mix*, *Demolition*, *Division*, *Dragon Mix*, *Meteor Multiplication*, *Minus Mission*
Edware, *Algebra 1*, *Algebra 2*, *Algebra 3*, *Algebra 4*, *Algebra 5*
Individual Software, *Professor Pixel*, *The Instructor*, *The Typing Instructor*
Knoware, *Knoware*
Scarborough Systems, *Mastertype*, *Songwriter Learning Co.*, *Addition Magician*, *Magic Spells*, *Moptown Parade*, *Number Stomper*, *Reader Rabbit*
Scholastic, *Turtle Tracks*
Sierra On-Line, *Dragon's Keep*, *Troll's Tale*
Simon & Schuster, *Typing Tutor III*
Spinnaker Software, *Alphabet Zoo*, *Delta Drawing*, *Fraction Fever*, *Hey Diddle Diddle*, *Kids on Keys*, *Kindercomp*, *Rhymes & Riddles*, *Story Machine*



The Paradise Modular Graphics Card runs all the popular programs Hercules does, plus 150 more.

Springboard, *Early Games for Young Children*, *Make a Match*, *Piece of Cake Match*, *Quizogon*

Thoroughbred Software, *Exploring the Amazing Food Factory*, *The Fascinating Story of Cell Growth*, *How Plants Grow*, *Migrating Molecules*, *Mastering Units of Measurement*, *Photosynthesis*
Unicorn Software, *Funbunch*, *Ships Ahoy*, *Ten Little Robots*
Digital Research, *DR Logo*
Energetics, *Energraphics*
Fox & Geller, *dGraph*, *OZ*
Graphic Communication, *Graphwriter BASIC*, *Graphwriter Combination*, *Graphwriter Extension*
Harvard Associates, *PC: Logo*
Innovative Software, *Fast Graphs*
Mouse Systems, *PC Paint*
PC Software of San Diego, *PC Crayon*
Peachtree Software, *Business Graphics System*
Arkrionics, *Jane*
Eagle Software Publishing, *Personal Financier*
Monogram, *Dollars and Sense*
Penguin Software, *Graphics Magician*
Sierra On-Line, *Homeward*
Adventure Enterprises, *Sea Dragon*
Atarisoft, *Centipede*, *Defender*, *Dig Dug*, *Donkey Kong*, *Pac Man*, *Robotron*, *StarGate*
Avalon Hill Game Company, *Andromeda Conquest*, *Computer Football Strategy*, *Computer Stocks & Bonds*, *V.C.*, *Voyager*

Broderbund Software, *Serpentine*
CBS Software, *Match-Wits*, *Mystery Master: Murder by the Dozen*
Hayden Software, *Sargon III*
Innovative Design Software, *Pool L5*
Intelligent Statements, *Asylum*
Microlab, *Crisis Mountain*, *Death in the Caribbean*, *Dino Eggs*, *High Rise*, *Minor 2049er*
Muse Software, *Castle Wolfenstein*
Odesta, *Backgammon*, *Checkers*, *Chess*, *Odin*
Origin Systems, *Ultima III*
Orion Software, *J-Bird*
PC Software of San Diego, *Championship Blackjack*
Penguin Software, *The Quest*
Priority Software, *Forbidden Quest*
Scarborough Systems, *Buck Rogers*, *Congo Bongo*, *Star Trek*
Sentinent Software, *Cyborg*
Sierra On-Line, *BC's Quest of Tires*, *Championship Boxing*, *CrossFire*, *Dark Crystal*, *Frogger*, *King's Quest*, *Oil Well*, *Ultima II*, *Ulysses and the Golden Fleece*
Sir Tech, *Wizardry*
Sirius Software, *Buzzard Bait*
Spectrum Holobyte, *Gato*
Spinnaker Software, *Snooper Troops #1*, *Snooper #2*
Sublogic, *Night Mission* Pinball

It's true, Hercules only runs 10 of the 161 programs with graphics for the IBM PC carried by SOFTSEL, the largest distributor of micro computer products.

Since the Paradise Modular Graphics card is 100% compatible with the IBM color graphics standard, it'll run virtually every program written for the PC. In monochrome. And in color. Now and in the future.

And we give you a \$50 trade-in allowance on your old Hercules or IBM card.

So see your dealer or call us. And get some good news for a change.

PARADISE
SYSTEMS, INC.

with envelopes, making it useful for anyone wishing to give a distinctive touch to printer-derived correspondence.

List Price: 32-sheet pack, \$9.95
Wizard Computer Accessories Inc.
 2423 W. Devonshire Ave.
 Phoenix, AZ 85015
 (602) 285-1355

Circle 672 on Reader Service Card

MixMatcher

Venture Associates Software has produced a program that allows the user to match compatible male and female applicants on the basis of answered questions. The program can handle up to 1,000 persons and can establish matches according to height, age, and up to 30 other criteria, each of which can be weighted by the user.

MixMatcher permits exclusive matching (where individuals are linked with only one other applicant) or nonexclusive matching (where individuals are matched with as many applicants as are compatible). Written entirely in Pascal, MixMatcher can complete 10 million comparisons of 1,000 applicants in under 30 minutes.

List Price: \$89.95
Requires: 256K RAM, one disk drive, PC-DOS.
Venture Associates Software
 P.O. Box 17824
 Salt Lake City, UT 84117
 (801) 263-1512

Circle 644 on Reader Service Card

C12 System

Sawtooth Software Inc. is offering a computer interviewing system that takes full advantage of the IBM PC's color and video ca-

pabilities to capture and hold a respondent's interest. The C12 System features a questionnaire design with flexible "skip" routines that act interactively on a respondent's answers. The program is also useful for conducting telephone interviews.

Versions of the C12 System range from a simple starter set, with a maximum of 50 questions given by a single interviewing station, to a full-featured standard set with 250 questions from an unlimited number of interviewing stations working simultaneously.

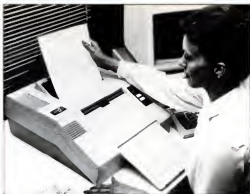
List Price: \$200-\$4,200
Requires: 128K RAM, one disk drive, DOS 2.0 or later.
Sawtooth Software Inc.
 P.O. Box 3429
 Ketchum, ID 83340
 (208) 726-7772

Circle 668 on Reader Service Card

CompuScan PCS Page Readers

CompuScan Inc.'s two new desktop document scanners add text-only or combined-text-and-image scanning to the IBM PC in a format compatible with popular word processing and other applications software. The CompuScan readers, models PCS 230 and PCS 240, read and recognize a standard page of text in about 30 seconds with high accuracy and are capable of identifying a range of commonly used office type styles. In addition to standard fixed-pitch fonts, the scanners can handle right-justified and proportionally spaced text and special symbols.

Both scanners incorporate a page-handling mechanism that accepts a wide range of paper sizes and types and can handle up



CompuScan PCS Page Readers, CompuScan Inc.

to 50 stacked pages unattended at the push of a button. Model PCS 240 can scan graphic images as well as text, converting scanned data into bit-mapped graphics that, with the included software, permit the user to display and store the image, manipulate the image with graphics software, add text to an image, alter the size of the image, and produce composite text/graphic documents.

List Price: Starts at \$5,695
CompuScan Inc.
 81 Two Bridges Rd., #2
 Fairfield, NJ 07006
 (201) 875-0500
 Telex: 21-9267

Circle 673 on Reader Service Card

International Computer Sales Directory

Technical Publishing Co., a subsidiary of the Dun and Bradstreet Corp., is offering an annual *Directory of Computer and Software Sales Agents and Distributors*. This compendium of companies who manufacture or import computers, software, and related equipment covers over 100 specific end-user application areas grouped into nine major categories and features listings of firms from 79 countries.

Listings include company names, addresses, phone and/or telex numbers, names of top executives, business activities, sales volumes, number of employees, application description, and brand names. Like Technical Publishing's other major compendiums, this international directory is indexed to allow the

reader to locate firms by names, geographic locations, application expertise, and by the name of the firm's OEM suppliers.

List Price: \$247
Technical Publishing Co.
 1301 S. Grove Ave.
 P.O. Box 1030
 Barrington, IL 60010
 (312) 381-1840

Circle 664 on Reader Service Card

TRUE GRID Digitizers

Houston Instrument has announced a line of digitizing tablets with active area sizes ranging from 5 by 5 to 24 by 36 inches. All TRUE GRID digitizers fea-



ture a nonglare surface, an RS-232 serial interface, and a choice of stylus, one-button cursor, or four-button cursor.

The TRUE GRID line is divided into two model ranges, the 1000 Series and the 8000 Series. Digitizers in the 1000 Series provide a medium resolution of .005 inch and can be used in such applications as menu selection or input of nonprecision images. The 8000 Series model—de-



signed for such applications as industrial design, mapping, and architectural drafting—offer a fine resolution of .001 inch and are available with an active area as large as 24 by 36 inches.

List Price: 1000 Series, \$495–\$975; 8000 Series, \$1,150–\$4,340

Houston Instrument
8500 Cameron Rd.
Austin, TX 78753
(512) 835-0900

Circle 671 on Reader Service Card

REFER

This utility from James Halstead and Associates works with most popular programming languages to produce readable source code listings. **REFER** concurrently analyzes the user's source code and prints a cross-reference of variables, values, keywords, line numbers, and/or segment labels. It can work with Ada, BASIC, C, COBOL, dBASE, FORTRAN, Pascal, and other languages.

List Price: \$39

Requires: 64K RAM, one disk drive, DOS or BASIC.

James Halstead & Associates
1551 Plainfield Rd.
Joliet, IL 60435
(815) 725-0346

Circle 643 on Reader Service Card

WALT LISP

ProCode International's version of the LISP programming language, **Walt LISP**, features a *WordStar*-like editor and over 250 functions. Its optimized assembly code does not require overlays or linking modules, allowing the interpreter to occupy less than 30K bytes of RAM.

Like Common LISP and other mainframe versions of the language, **Walt LISP** has a complete suite of mappers, built-in pretty printing and level printing, fast sort and merge routines, and advanced program control structures (DO, LET, CATCH, THROW, and others). It supports functions of "lambda," "lambda," "lexpr," or "macro" types and both splicing and nonsplicing character read macros. **Walt LISP** also features true dynamic character strings and integers of up to 611 digits with selectable radix. Its DOS inter-

face is compatible with the DOS 2.0 filing system, making full use of subdirectories and other system characteristics.

The package includes programs for file comparison, file sorting, advanced file operations, two virtual-function definition schemes, and a Prolog interpreter called *Clog*. All of these supplied programs include fully annotated LISP code.

List Price: \$169

Requires: 128K RAM, one disk drive, DOS 2.0 or later.

ProCode International
P.O. Box 107
Flanders, NJ 07836
(201) 927-0611

Circle 658 on Reader Service Card

PC MAP II

This latest version of the popular contour mapping program from Peerless Engineering Service can produce two-dimensional or three-dimensional contour maps. It accepts up to 5,000 randomly entered XYZ points from any ASCII file and interpolates grids of up to 65,536 nodes. In addition, files of boundary lines can be added to any two-dimensional plot and line labels can be included as part of the line pattern.

List Price: \$995; manual alone, \$25

Peerless Engineering Service
5819 Soquel Dr.
Soquel, CA 95073
(408) 462-0330

Circle 669 on Reader Service Card

Half-Height Bernoulli Box

Complementing its line of full-height mass storage systems, Iomega Corp. has released four models of cartridge drives requiring only half the space of the



original Bernoulli boxes. The new Bernoulli box subsystems are available with four storage capacity configurations: 10-

megabyte single and 20-megabyte dual drive units with average access times of 38 milliseconds, and 20-megabyte single and 40-megabyte dual drive units with access time of 38 milliseconds. The data transfer rate for the units is 1.13 megabytes per second, or as fast as the user's system will allow.

List Price: \$2,695–\$4,495, depending on configuration

Iomega Corp.
1821 W. 4000 South
Roy, UT 84067
(801) 778-1000

Circle 658 on Reader Service Card

MM/ENTR

Users of *WordStar* with the *MailMerge* mailing list system might find this data entry program from ELLIAM Associates a welcome addition to their existing software. **MM/ENTR** allows the user to enter *MailMerge* data field by field, without regard to commas, quotes, and blank fields. When the last field has been entered, the user can either save a record or go back and edit it. The resulting data file is compatible with *WordStar*'s nondocument mode.

MM/ENTR can handle up to 30 fields per record. In addition to its uses as a *MailMerge* data entry system, the software can create any kind of ASCII sequential data file.

List Price: \$19.95

Requires: 64K RAM, one disk drive, DOS, *WordStar*, *MailMerge*.

ELLIAM Associates
24000 Bessmer St.
Woodland Hills, CA 91367
(818) 348-4278

Circle 655 on Reader Service Card



askSam

This text-oriented database management system from Seaside Software frees the user from concerns regarding fixed field lengths, fixed records, and limited indexes. Incorporating many aspects of a general-purpose data storage and retrieval system, **askSam** places data in variable-length fields, permitting the user to store anything from pure text to specific field-oriented records within a single system. In all cases, records can be retrieved based on any part of their content.

Features built into the software include a command language processor for programming applications, preestablished batch file operations, password and data encryption functions, full math operations with 13-digit precision, and flexible sorting routines on any number of fields. **askSam** can handle a file with up to 4 gigabytes of data, with variable-length records of up to 1,600 bytes each. All operations are menu-driven and can be automated through the software's command language or batch file processors.

List Price: \$149.95

Requires: 128K RAM, one disk drive, DOS 2.0 or later.

Seaside Software
538 Parada Dr.
Corpus Christi, TX 78412
(512) 991-2019

Circle 653 on Reader Service Card

COMCOP

Crosby/Lyhus Inc. has developed a program to manage Rolm telecommunications switches using an IBM PC. **COMCOP** creates telephone extension profiles controlling such Rolm switch

If you *don't* have data worth preserving, then the reasons for buying Cartrex's new 1/4-inch, high performance, virtually error-free tape cartridge won't mean anything

But, if you are one of the many 1/4-inch tape cartridge users that assume 3M's cartridges just *have* to be "good enough" for today's high performance tape drives, read these simple facts to understand why that isn't true anymore.

PILOTS HAVE A SAYING,

"There are those who have made a wheels-up landing—and those who will." You can apply this expression to those who have lost data and those who will. Unfortunately, data loss isn't always because users haven't backed-up their hard disk. Sometimes it's because they're using a 1/4-inch tape cartridge, where they back up their hard disk, developed hard errors—those insidious errors that tend to increase over time. That's why Cartrex has developed a 1/4-inch data cartridge for today's high performance drives that virtually eliminates errors.

Why a new cartridge

When 3M announced its cartridge in 1971, it was designed for a low capacity tape drive with less than 3 megabytes—2.88 to be exact. The tape was low in density—1600 bits per inch with only 4 tracks and 300 feet of tape.

The tolerances required for the tape drives of the early 1970's were fine for then, but today's tape drives require much tighter tolerance. Today's tape cartridges must work with drives that have 9 or more tracks and bit densities as high as 12,000 bits per inch on 600 feet of tape. That means capacity increases of 2,000 percent packed into the same cartridge.

The reasons that yesterday's cartridge technology simply won't work properly in today's high capacity drives is inherent in the cartridge design.



The new Cartrex 1/4-inch tape cartridge is the first new tape cartridge design in almost a decade and a half. Tape drive manufacturers now have a new cartridge technology which allows them to advance beyond this previous artificial barrier.

With the significant increases in capacity, the three culprits that make cartridge tolerances so important are fluctuating tape tension, redeposit modules, and instantaneous speed variations (or ISV).

Tape Tension

Any child who has played with a magnet understands that as the magnet is separated from metal, the magnet's ability to work is decreased. So

it's no surprise to find out that the closer the tape drive head is to the tape, the better the reading. This closeness is particularly important when the embedded iron filings get packed tighter in today's high density tape.

It's also important with the increase in the number of tracks. After

all, you wouldn't want the head to be reading an adjacent track any more than you'd want it reading more than one magnetic representation of a bit.

Unfortunately, tape tension historically has not been constant. As the tape unwound, the tension increased. What's important is both the amount and range of tension. A fluctuating increase or decrease in tension is as unacceptable as low tension is in the first place. As the accompanying graphs

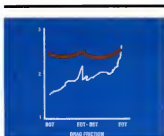


The Cartrex cartridge design (upper left) uses the N2 principle which creates head-to-tape tension by applying a mechanical differential at the rear pulley between a stiff transport belt and a stiff tensioning belt, indicated in green and yellow in the color schematic (upper right).

The conventional 3M design applies drag at the rear pulley to create tension, which creates heat, and limits future speeds much above 90 inches per second.



Legend:
Blue: tape
Yellow: belt
Green: pulley
Red: pulley
Yellow: pulley
Yellow: pulley



Good head-to-tape tension ensures the highest probability of reliably capturing data. Fluctuating tape tension allows data loss due to head-to-tape separation and smearing redeposit nodules across the tape head. The Cartrex cartridge, compared to the conventional design, creates constant and higher tension.

show, the Cartrex cartridge has higher tension and flatter profile than the 3M cartridge. This means more reliable data across the entire tape.

Redeposit Nodules

Another reason to keep constant tension is to avoid "redeposit nodules" from smearing across your tape drive's head. What are redeposit nodules? They are the insidious flakes of tape media that break off from the edges of the tape and get dragged up to the edge of the tape head. If the tension is low, or becomes low when the tape starts or reverses, the flakes come up over the edge, get smeared over the head, and reduce its ability to read the data.

Even worse, however, is that these redeposit nodules are dragged along the surface of the tape and get embedded and packed over time. When your drive tries to read the data, the redeposit nodules act as a tent pole holding up the tape away from the head. As a result, even the best error-recognition algorithm can only tell you one thing—you've lost the data.

You might be wondering what causes the flaking in the first place. Again, it is cartridge design. The basic design uses a tape guide, shown in the accompanying illustration. The problem with this approach, is that it presupposes that the tape will always run parallel to the top and bottom caps of the tape guides. At the low speeds of

30 inches per second typical of when the 3M cartridge was designed, it was less of a problem. But at today's speeds of 90 inches per second and more, the tape wanders. When it presses against the top of the tape guide, the tape's edge pressure builds. Not only does media flake off, but you lose data due to the "coining" or "scallop" effect.

Cartrex eliminated the cause of the tape coining or scalloping by developing a barrel-shaped roller placed prior to the tape guide. The laws of physics show that by riding on a rounded barrel, the tape will always seek the middle, reducing the tape edge pressure. This seemingly simple addition causes the tape to always enter the tape guide with zero edge pressure. In this way, the possibility of media flaking off and creating redeposit nodules is virtually eliminated.

Instantaneous Speed Variation (ISV)

Instantaneous speed variations is exactly what it sounds like—small, instantaneous changes in tape speed as it crosses the tape head. At slow tape



You can compare the Cartrex design on top with the conventional 3M design (lower left) and DEI, a 3M licensee (lower right). The omission of "edge tension reduction guides" (indicated in dark blue on the color schematic) on either the 3M or DEI design means that tape edge pressures will increase causing the magnetic media to flake off, smear across the tape head, and cause "redeposit nodules" to become embedded in the tape.

speeds and low bit densities—like the 1971 standard of 30 inches per second and 1,600 bits per inch—ISV wasn't as big a problem. At that time, the bits were crossing the head at 48,000 bits per second.

Today, however, the story has changed. 90 inches per second and 8,000 bits per inch mean that 720,000

bits cross the head every second. A 1,500% increase.

As you may have guessed, speed fluctuations in the 48,000 bits per second made reading data difficult for tape drive electronics. But when the electronics have to guess whether or not the bit rate of 720,000 bits per second is accurate, the electronics can become overwhelmed.



High speed tape without the "edge pressure reduction guide" seldom enters tape guides parallel to the top and bottom. The edge pressure which results creates "scallop" or "coining" on the tape. The effect is data loss due to head-to-tape separation, flaking media that smears across the head, and "redeposit nodules" that create hard errors.

Never a Single Issue

Your tape drive seldom has the luxury of dealing with an isolated problem. It's usually a combination of ISV, redeposit nodules, and tension problems all together. Now you understand why Cartrex wanted to develop a cartridge for a market that needed a modern alternative.

Where to get it

Not only has Cartrex improved on the industry's 15 year old technology, they have done it for a competitive price.

Now you can have peace of mind when you back up your hard disk on today's sophisticated tape drives.

And you can have it fast. Simply phone:

(619) 485-6603 EXT 100
and give Cartrex your credit card number and they will send your cartridges by return mail.



CARTREX CORPORATION
MARKETING HEADQUARTERS

11590 WEST
BERNARDO CT.
SUITE 230

SAN DIEGO
CALIFORNIA
92127

619-485-6603

CARTREX

CIRCLE 525 ON READER SERVICE CARD

characteristics as class of service, call forwarding procedures, pick groups, COM groups, and hunt groups for each extension. Data included within each user profile includes name of user, department, location, cabling specs, telephone equipment, and pad address. COMCOP assembles its relational database, assigning extension profiles to their corresponding user profiles.

Among the standard reports available from the software are move and change orders, problem reporting, organization directories, system speed and FAC directories, equipment inventory, trunk information, as well as detailed user and extension profiles. Also provided is an on-line attendant directory for use by switchboard operators.

Two versions of the program are currently being offered: COMCOP for systems with more than 144 extensions and COMCOP VS for VS switches with less than 144 extensions.

List Price: COMCOP VS, \$1,500; COMCOP, \$5,000

Requires: 256K RAM, two disk drives, DOS.

Crosby/Lyhus Inc.
40 Bedford Rd.
Ammon, NY 10504
(914) 273-8630

Circle 662 on Reader Service Card

Logger

This RAM-resident utility tracks and records computer usage, producing audit trails and documentation for tax and client-billing purposes. *Logger* re-



ports include the user's name, weekday, date, time-in and time-out, directory name, and a variety of user-definable parameters. The program's output can be used directly by 1-2-3 and other applications.

List Price: \$74.95

Requires: 128K RAM, two disk drives, DOS.

System Automation Software Inc.
8555 16th St.
Silver Spring, MD 20910
(301) 565-8080

Circle 670 on Reader Service Card



TravelComm 1200, TouchBase Design

TravelComm 1200

This compact, lightweight modem provides 300 or 1,200 bit-per-second operation in a form useful when traveling with a personal computer. Among the TravelComm 1200's features are tone dialing and automatic transfer-rate selection and the ability to connect directly to the RS-232 port in the user's system, eliminating the need for an additional cable (though an interface cable is provided as well).

List Price: \$249

TouchBase Design
1447 S. Crest Dr.
Los Angeles, CA 90035
(213) 277-1208

Circle 660 on Reader Service Card

Mind Over Minors

Human Edge Software has released a program designed to help parents or teachers manage, discipline, reward, and motivate children based on the personality profiles of both the child and adult. After completing a self-assessment session with the software, the adult answers a series of questions about the child for whom he or she is responsible. Questions are presented on-screen in the form of adjectives with which the adult assesses the child's behavior and personality.

The program then compiles the answers into a four- or five-page strategy report.

Two versions of the *Mind Over Minors* program are available, one each for parents and teachers. The parental version includes a companion book, *Managing Children*, which discusses practical strategies for child rear-

ing, the most common pitfalls and problems of the parenting process, and techniques adults can use for improving the parent-child relationship.

List Price: \$59.95

Requires: 64K RAM, one disk drive, DOS.

Human Edge Software
2445 Faber Pl.
Palo Alto, CA 94303
(415) 493-1593

Circle 675 on Reader Service Card

Medical and Psychological Previews

This on-line database—one of several database services maintained by BRS/Saunders for medical professionals—provides the user with access to the current literature from over 160 medical and psychological journals, as well as key literature in psychiatry, nursing, and hospital administration.

Articles are listed on the service within 10 days of their receipt in libraries across the United States. They are maintained on the service for 3 months.

BRS/Saunders
1200 Rte. 7
Latham, NY 12110
(518) 783-1161

Circle 666 on Reader Service Card

MarsPlus

This on-line service from the Tymnet Network Applications Division of McDonnell Douglas Corp. allows the user to access the airline reservation system of subscribing airlines to select flights, compare fares, and produce tickets for passengers. Subscribing airlines currently include TWA, Pan American, Eastern, USAir, Northwest Orient, Piedmont, Republic, Ozark, and Continental. Additional airlines are added to the service regularly. MarsPlus also offers the unbundled fares database maintained by Airline Tariff Publishing Co.'s Electronic Tariff and the worldwide telex network of FTC Communications New York.

Tymnet Network Applications
2720 Orchard Pkwy.
San Jose, CA 95134
(408) 446-6278
(408) 942-5280

Circle 665 on Reader Service Card

Inventory

The Union National Bank of Little Rock, Arkansas, is marketing a banking supplies inventory program developed originally for internal use. *Inventory* can record vendors, track usage, and simplify reordering of stock for banks or other institutions that maintain large stocks of paper and expendable supplies. It produces five reports, including reorder and on-order lists, and can display color bar graphs of an inventory's usage history.

List Price: \$395

Requires: 128K RAM, two disk drives, DOS 2.0 or later

Union National Bank of Little Rock
1 Union National Plaza
P.O. Box 1541
Little Rock, AR 72203
(501) 378-4000

Circle 667 on Reader Service Card

RACORE-NET

Racore Corp. has introduced a coaxial cable-based networking system that can link up to 16 IBM PCs up to 1,000 feet apart. Gateways are provided for linking two or more RACORE-NET clusters and for linking the system to IBM's PC Network. An optional RS-232 gateway can link the system to most other popular

networking systems.

RACORE-NET uses token-passing ring architecture for a data transfer rate of 2 megabits per second, with each linked PC queried every millisecond for network traffic. This arrangement does not require a dedicated PC as network server, although a hard-disk-equipped PC is required to handle file storage and print-buffering functions. The network is designed to use PC-DOS 3.1 and IBM's PC Network software and is compatible with the IBM system at DOS/BIOS interrupt levels. Software designed

While retaining a database format compatible with *dBASE II*, *FoxBASE II* uses a B+ tree algorithm to maintain index files, requiring up to 50 percent less disk space than comparable *dBASE II* index files. Program limitations are less than those of *dBASE II*: Files can have up to 48 fields, sorts are performed up to 20 times faster, and up to 128 memory variables can be created simultaneously within a command file.

FoxBASE II is available in two versions: Development and Runtime. The Development ver-



RACORE-NET, Racore Corp.

to work within these constraints will operate on Racore Corp.'s system.

Repeater devices are available to increase the distance between networked PCs beyond the 1,000-foot limit to up to 10,000 feet. RACORE-NET uses standard RG 59U 75-ohm coaxial cable and requires that a full-length board be installed in each PC linked to the network.

List Price: \$295 per node

Racore Corp.

10 Victor Sq.
Scotts Valley, CA 95066
(408) 438-7255
Telex: 45-3003

Circle 661 on Reader Service Card

FoxBASE II

Fox Software Inc. has released a relational database management system that is source code compatible with *dBASE II*, allowing it to be used with existing *dBASE II* applications without changes. Written in C, *FoxBASE II* compiles source code into compact object code as it is read from disk. The object code is placed entirely in system memory, minimizing disk access delays.

When using the decision-making abilities.



FoxBASE II, Fox Software Inc.

When used in the decision-making process, the program asks a series of key questions about the nature of the decision, and those answers determine the logic course the system follows in presenting a recommendation.

Results from *Decision Aid for Managers* include a strategy to follow for reaching the decision, with a rationale for the conclusions reached.

List Price: \$190

Requires: 128K RAM, two disk drives, PC-DOS, BASIC.

Applied Sciences Associates

P.O. Box 1072
Butler, PA 16003
(412) 284-7135

Circle 645 on Reader Service Card

Org

The task of creating organization charts has been simplified with this program from Banner Blue. *Org* allows the user to quickly en-

ter names, titles, and comments into a full-screen display that shows each manager and up to 16 direct subordinates. The user can easily move around the chart to add, delete, or move positions or departments.

When printing, the software automatically draws boxes, centers text, and precisely lays out connecting lines. Detailed charts can be produced with up to 250 positions displayed on a sheet as large as 11 by 14 inches. With user-defined abbreviations, the program can shrink large charts for presentation purposes or print out sections of a chart at one time. An on-screen map of the chart is always available.

List Price: \$69.95

Requires: 192K RAM, one disk drive, DOS 2.0 or later.

Banner Blue

P.O. Box 7865
Fremont, CA 94537
(415) 794-6850

Circle 654 on Reader Service Card

sion includes the program itself, an on-line help facility, and the command file compiler. The Runtime version, for running DBMS-based applications without the main program, adds a runtime module to the software.

List Price: Development

version, \$395; Runtime

version, \$695

Requires: 192K RAM, one disk drive, DOS.

Fox Software Inc.

13330 Bishop Rd., P.O. Box 269
Bowling Green, OH 43402
(419) 352-3568
TWX: 810-499-2989

Circle 657 on Reader Service Card

Decision Aid for Managers

Applied Sciences Associates has developed a program that creates and stores a personality profile of the user that can be used to help make decisions. The program presents a 70-question form for personality evaluation. *Decision Aid for Managers* then asks for input on the company's organizational characteristics. Together with the personality evaluation, the data is stored on-disk as a pro-



Org, Banner Blue

What the world really needs is a 69 cent Double Sided, Double Density Diskette with a LIFETIME WARRANTY!

And DISK WORLD! has it.

**Introducing Super Star Diskettes:
the high quality diskette with
the lowest price
and the best LIFETIME WARRANTY!**

In the course of selling more than a million diskettes every month, we've learned something: higher prices don't necessarily mean higher quality.

In fact, we've found that a good diskette manufacturer simply manufactures a good diskette...no matter what they charge for it. (By way of example, consider that none of the brands that we carry has a return rate of greater than 1/1,000th of 1 percent!)

In other words, when people buy a more expensive diskette, they aren't necessarily buying higher quality. The extra money might be going toward flashier advertising, snazzier packaging or simply higher profits. But the extra money in a higher price isn't buying better quality.

All of the good manufacturers put out a good diskette. Period.

How to cut diskette prices ...without cutting quality.

Now this discovery posed a dilemma: how to cut the price of diskettes without lowering the quality.

There are about 85 companies claiming to be "diskette" manufacturers.

Trouble is, most of them aren't manufacturers. Rather they are laborers or marketers, taking other company's components, possibly doing one or more steps of the processing themselves and passing their labels on the finished product.

The new Kisman Kodak diskettes, for example, are one of these. So are IBM 5 1/4" diskettes. Same for OSA Polaroid and many, many other familiar diskette brand names. Each of these diskettes is manufactured in whole or in part by another company!

So, we decided to act just like the big guys. That's how we would cut diskette prices...without lowering the quality.

We would go out and find smaller companies to manufacture a diskette to our specifications, specifications which are higher than most...and simply create our own "name brand" diskette.

Name brand diskettes that offered high quality at low prices.

SUPER
STAR
DISKETTES

5 1/4"
SSDD
\$.55 ea.
Qty. 50

5 1/4"
DSDD
\$.69 ea.
Qty. 50

Super Star diskettes are sold in multiples of 50 only. Diskettes are shipped with white Tyvek sleeves, reinforced hubs, user ID labels and write protect tabs.

Boy, did we get lucky. Our Super Star Diskettes are the same ones you've been using for years...without knowing it.

In our search for the low priced, high quality diskette of our dreams, we found something even more interesting.

We found that there are several manufacturers who don't give a hoot about the consumer market for their diskettes. They don't spend millions of dollars in advertising trying to get you, the computer user, to use their diskettes.

Instead, they concentrate their efforts on turning out the highest quality diskettes they can...because they sell them to the software publishers, computer manufacturers and other folks who (in turn) put their name on them...and sell them for much higher prices to you!

After all, when a software publisher or computer manufacturer or diskette marketer puts their name on a diskette, they want it to work time after time, everytime. (Especially software publishers who have the nasty habit of copy-protecting their originals!)

Super Star Diskettes. You already know how good they are. Now you can buy them...cheep.

Well, that's the story.

Super Star diskettes don't roll off the boat from Pago-Pago or emerge from a basement plant just east of Nowhere.

Super Star diskettes have been around for years...and you've used them for years as copy-protected software originals, unprotected originals. Sometimes, depending on which computer you own, the system master may have been on a Super Star diskette. And maybe more than once, you've bought a box of two or more of Super Star diskettes without knowing it. They just had some "big" company's name on them.

Super Star Diskettes are good. So good that a lot of major software publishers, computer manufacturers and other diskette marketers buy them in the tens or hundreds of thousands.

We buy them in the millions.

And then we sell them to you.

Cheep.

**When every little bit counts,
it's Super Star Diskettes.**

You've used them a hundred times...under different names.

Now, you can buy the real McCoy, the same diskette that major software publishers, computer manufacturers and diskette marketers buy...and call them ours.

We simply charge less.

Super Special!

Order 50 Super Star Diskettes and we'll be happy to sell you an Amaray Media-Mate 50 for only \$8.75, shipping included...a lot less than the suggested retail price of \$15.95



Regular DISK WORLD! price: \$8.69 ea.
+ \$2.00 Shpg.

The Super Star LIFETIME WARRANTY!

Super Star Diskettes are unconditionally warranted against defects in original material and workmanship so long as owned by the original purchaser. Returns are simple: just send the defective diskettes with proof of purchase, postage paid by you with a short explanation of the problem, and we'll send you the replacements. (Incidentally, coffee stained diskettes and diskettes with staples driven through them don't qualify as "defective.")

**WE WILL MEET OR BEAT ANY NATIONALLY
ADVERTISED PRICE
ON THE SAME PRODUCTS AND QUANTITIES
SUBJECT TO THE SAME TERMS AND CONDITIONS.**

DISKETTE STORAGE CASES

DISK CADDIES

The original flip-up holder for 10 5 1/4" diskettes. Beige or Grey only.

\$1.65 ea. + .20 Shpg.

DISKETTE 70 STORAGE

Dust-free storage for 70 5 1/4" diskettes. Six dividers included.

An excellent value.
\$9.95 ea. + \$3.00 Shpg.



HOW TO ORDER:

ORDERS ONLY:
1-800-521-6827
(In Illinois: 1-312-256-7140)

INQUIRIES:
1-312-256-7140

FOR FASTEST SERVICE, USE NO-COST MCI MAIL. Our address is DISKORDER. It's a FREE MCI MAIL letter. No charge to you. (Subject permitting, we'll ship these orders in 2-4 hours or less.)

SHIPPING: 5 1/4" & 3 1/2" DISKETTES—Add \$3.00 per each 100 or fewer diskettes. **OTHER ITEMS:** Add shipping charges as shown in addition to other shipping charges. **PAYMENT:** VISA, MASTERCARD and Personal orders accepted. **COD ORDER:** Add additional \$5.00 special handling charge. **APO, FPO, AK, HI & PR ORDERS:** Include shipping charges as shown and add 5% of total order amount to cover air and insurance. We ship only to United States addresses except for those listed above. **TAXES:** Illinois residents, add 7% sales tax.

MINIMUM ORDER: \$35.00

HOURS:
Human: 9AM-6PM Central Time, Monday through Friday
Answering Machine: 6PM-9AM, All Times
MCI MAIL: 24 hours a day.

DISK WORLD!, INC.

**629 Green Bay Road
Wilmette, Illinois 60091**



REESTABLISHES THE COST TO PERFORMANCE BASELINE.

Allen-Harris Industries, Inc. brings you the price and performance that you demand from today's technology. With a unique data repository concept, GP-Tools breaks through the boredom of data base management with GP-File, GP-Print and GP-Utility.

GP-FILE

- Data file attributes and screen display formats generated in one step.
- Instantaneous screen displays.
- Data retrieval in a fraction of the time found in other systems... regardless of primary or secondary key assignment.
- Security with encrypted password protection for your data.
- Up to 99 sub-views of your master data file display (each with a password option).

GP-PRINT

- Design your reports on the screen... graphically!
- Produce an unlimited number of sophisticated reports for each data file.
- Wide variety of printers supported...plus, custom printer option!
- Send reports to screen, printer or disc.
- Modify report formats easily.

GP-UTILITY

- Modify data file attributes or screen display formats.
- Sort files with parameters to enhance reports.
- Obtain data file structure information.
- Change password for maximum protection.
- File management.

ALLEN-HARRIS INDUSTRIES, INC.
130 UNIVERSITY PARK DRIVE - SUITE 185
WINTER PARK, FLORIDA 32792
TELEPHONE 305/657-1144



To order or for more information, call: 1-800-821-2165
In Florida, call collect: (305) 657-1144

\$69.⁹⁵

Major Credit Cards Accepted

GP-TOOLS is a division of Allen-Harris Industries, Inc.
GP-TOOLS includes GP-File, GP-Print and GP-Utility

CIRCLE 234 ON READER SERVICE CARD

Ho! Ho! Ho! We're Bringing You The Best Values Of The Year. (Just In The "Nick" Of Time!)



SOFTWARE

Alpha Software	
Electric Desk (PC)	\$209
ESP	499
■ Keyworks	60
Ashton-Tata	
d-Base II	Call
d-Base III (v.1.1)	Call
Framework	Call
Friday	\$170
Borland	
Sidekick	
(unprotected)	\$ 69
Turbo Pascal (v.3.0)	45
wr607	75
Superkey	55
Connecticut Software	
Printer Base (v.5)	\$ 99
■ Sideline	45
Decision Resources	
Diagram Master	
.....New	\$279
Chart-Master	215
Sign-Master	159
Digital Marketing	
Gremmatik	\$ 60
Notebook II	149
Proofreader	42
Digital Research	
■ Gem Graph	\$165
■ Gem Wordcraft	110
Gem Draw	105
Gem Desktop	39
Emerging Technology	
Edix (editor)	\$139
Prof Writers' Pkg.	319
Enertronics	
Emergaphics	\$209
w/Plotter Option	269
Fox & Geller	
Quick Report	\$159
Quickcode II or III	150
dGraph II or III	159
Pessky	35
FYI	
FYI 3000	\$259
Sort	99
Innovative Software	
Smart System	\$490
Other Products	Call
Lifetech Software	
Volkswriter	
Scientific	\$299
Volkswriter Deluxe	155
Living Videotext	
Think Tank (256K)	\$110
Latus	
Spotlight (formerly	
from Software	
Arts)	\$109
MDBS, Inc.	
K Graph	\$139
K Text	109



HOLIDAY SPECIALS

Oasis	
Word Plus	\$109
Software Publishing	
(Jr. compatible)	
PPS: File, Graph, Plan,	
PPS: Access	\$ 75
PPS: Report	72
Software Research	
Smartway	
w/FREE Smart path	\$ 35
CDC	
Halt Hi	\$ 80
Harcules	
Graphics Board	\$295
Keytronics	
KB 5149 Numeric Keypad	\$ 65
Microsoft	
Mouse	\$135
Quadram	
Quadboard 64K (Cik/Cal, S & P)	\$199
Quad Jr. Exp. Chassis	305
■ U.S. Robotics	
2400 MicroLink Modem	\$465
Ultra Magnetics	
S-1/4" DD/DD (Box of 10)	\$ 18
Zenith	
ZVM1220 12" Amber Monochrome	
Monitor	\$145
K Paint	65
K Report	139
K Mouse	60
Knowledge Men	258
■ K-Man 2 Update	450
Mail	220
Manio Corp.	
In-Search	\$310
Pro Search	369
MicroPro	
WS ProPak (WS,	
CS, MM, SI)	\$255
Wordstar	175
Wordstar 2000	255
Wordstar 2000+	295
Microsim	
R:Base 5000	\$369
R:Base Clout (v.2.0)	129
Report Writer	89
R:Base -4000	265
Microsoft	
■ Excel	\$299
■ Quick Basic Comp	75
■ Windows	75
Macro Assembler	99
Business Basic	
Compiler	269
Flight Simulator	39
Fortran Compiler	259
C Compiler	225
Chart	159
MuMath/MSimp	
(DOS)	179
Pascal Compiler	199
Project	169
Multiplan	
(MS/DOS) (v. 1.20)	129
Word (v.2.0) (DOS)	229
Microsoft	
Crosstalk (DOS)	\$ 99
Crosstalk (CPM)	139
Remote	119

Multimate Systems, Inc.	
Multimate (v.3.3)	\$229
■ Advantage	454
■ Just Write	111
■ On File	111
■ NWA - Quality	
Analyst	\$355
Pater Norton	
Norton Util (v.3.0)	\$ 59
Oasis	
Publication & Style	99
Office Solutions	
Office Writer	Call
Open Systems	
Alli Acct'g.	
Progrms	\$339
■ Open for Business I	449
■ Open for Business II	750
Peladin	
Flashcalc	
(formerly Vialcalc)	Call
Peechtree Software	
Back to Basics	
Acct'g System	\$210
Pesch Pak 4	
(GL, AP, AR)	229
Acct'g Modules	319
Prentice Hall	
VCN Execuision	\$250
Executive	
Libraries	\$ 55
Rosasoft	
Prokey (v.4.0)	\$ 89
SPI Open Access	\$319
Satellite Software	
Word Perfect w/Sp.	\$239
Personal Word	
Perfect	110
Word Perfect Jr.	49
Sensible Designs	
d Programmer	\$199
Softcorp, Inc.	
PRO-JECT 6	Call
Softcific	
Fancy Fonts (v.2.0)	\$135
■ Fancy Word	119
■ Softronics - Softorm	
PC	\$169
Software Group	
Enable	\$419
Star Software	
Accounting Partner	\$219
Acct'g. Partner II	599
Upgrades also avail.	Call
Stuologic Jet	\$ 39
Supersoft	
We're an offer on	
stock available	
Thoughtware	
Trigger	\$329
Warner Software	
(Jr. Compatible)	
Desk Organizer	\$ 63

BOARDS

AST Research	
■ Knight Data Security	
Mgr.	\$230
Six Pak Plus 64K	
(S & P, Cik/Cal, exp.	
to 384K)	229
CC-332	299
Preview Bd	267
Advantage (AT) 128K	449
DCA	
Irma Board	Call
■ Eversax	
The Edge	\$329
Graphics Edge	359
Hayes	
Transit 1000	\$329
Harcules	
Color Card	\$195
Maynard Electronics	
Floppy Drive Cntr.	\$119
Sandstar	Call
Pardalis	
■ S Pak Board	
Modular Display	
Card	285
Quadram	
Microfazer Stack Printer	
-P/P 6K	\$139
-S/P & S/S 8K each	
(exp. 64K only)	140
Quadboard Silver	Call
Quadboard Gold	Call
Qudsprint	479
All Other Products	Call
■ STB - Cheuffsur Bd.	\$295
Tecmar	
Expansion Chassis	\$679
■ Graphics Master	459
■ Maesfro	430

PC Jr. ACCESSORIES

Kaytronic	
KB 5151 Jr.	\$169
Quadram	
Quad Jr. Exp. Mem.	
(for Chess)	\$195
Tecmar	
Jr. Captain	
(128K, C/P)	\$315
Jr. Cedet (64K)	169

FLOPPY DISK DRIVES

CDC 1600	\$119
Tandon TM 100-2	
floppy	\$129
Tasc Half Hi	\$109

ALL NEW HARD DISK DRIVES

IBM Drives	
10MB Seagate HD w/cntrlr. (1/2 high w/ full face plate)	\$499
10MB Shugart HD w/cntrlr. (1/2 high w/ full face plate)	399
10MB Tandem HD w/cntrlr. (full height)	499
10MB Tandem HD w/cntrlr. (1/2 high w/ full face plate)	579
10MB Maynard HD w/cntrlr. (#210GA 1/2 high w/ full or 1/2 hi plate)	899
20MB Seagate HD w/cntrlr. (full height)	
20MB Miniscribe HD w/cntrlr. (full height)	759
19.1MB Tandem HD w/cntrlr. (full height)	719
20MB Rodime HD w/cntrlr. (1/2 height)	795
20MB Maynard HD w/cntrlr. (1/2 high w/ full or 1/2 hi plate)	999
IBM AT Drives	
20MB Seagate HD w/cntrlr. & rails (#4026 full height - 30 millisecond)	\$ 959
20MB Seagate HD w/cntrlr. & rails (#5T225 1/2 high-80 millisecond)	559
20MB Miniscribe HD w/cntrlr. & rails (1/2 high - 80 millisecond)	669
20MB Rodime HD w/cntrlr. & rails (#232E full height - 55 millisecond)	699
30MB Rodime HD w/cntrlr. & rails (full height - 55 millisecond)	1069
30MB Seagate HD w/cntrlr. & rails (#4038 full height - 37 millisecond)	1099
Tape Back Up Systems	
Alloy Computer Products	
PC Backup	\$1695
i-Omega	
10 + 10H Bernoulli Box	2459
10H Bernoulli Box	1795
Scotable HD cntrlr.	250
Non bootable HD cntrlr.	115
Irwin	
Tape Drive #1100	595
Backup tape subsystem	850
Maynard	
Maystream System 20 w/cntrlr. card #MS1101A	1279
Mountain Computers	
27MB tape only	1799
Tecmar	
CIC-60AT Internal tape drive #B11604	1495
Power Supplies	
63.5 Watts power supply	\$ 69
130 watts switching power supply (PC)	109
200 watts switching power supply (PC-AT)	199

COMPUTERS

IBM PC	
256K, 2-360K floppy drives & keyboard	\$1599
IBM PC XT, AT	Call
Zenith	
Entry level PC (ZF-148), 2-360K floppy drives, 128K exp. to 768K, switch 5 MHz to 8 MHz, 1 serial, 1 parallel, RGB w/ composite output, with MS DOS and NEW Zenith ergonomic arm monitor, complete for	\$1459
Zenith	
LCD or lightweight portable, advanced PC (AT compatible)	Call

PRINTERS

Epson	Call
NEC 3550	Call
Okidata	Call
Quadram	
Quad Laser - For applications that require fast turnaround time.	\$395
Quadjet	\$395
Toehibe	Call
Cable	Call
...and much more.	

MODEMS

Hayes	
Smartmodem 300	\$155
Smartmodem 1200	379
Smartmodem 1200B	369
Smartmodem 2400	Call
Quadram	
Quadmodem II	Call
US Robotics	
Password	\$309
Vantel	
Half Card modem	Call
Cables	
	Call

MONITORS

Amdak	
310A	Call
300 Cir	\$265
710 Cir	569
PGS	
HX 12 RGB Color	\$469
Max 12E	175
Quadram	
	Call
Sanyo	
8112 12" HR Green	\$189
Texon	
Model 420L RGB	\$499
Zenith	
ZYM 136 13"	Call
RGBULP	\$599
ZYM 135 13" RGB	459
ZYM 1223 12"	Call
Gr. Mono	145
Cables	
	Call

■ Indicates new products introduced in this ad.

DISKETTES

3M 5 1/4" DS, DD (Box/10)	\$ 25
Maxell	
MD2-HD (diskettes for IBM PC-AT, Box/10)	49
Verbatim	
5 1/4" DS, DD (Box/10)	\$ 25

MISC.

Electronic Protection Devices	
Time / EC-II	55
PeetREC-IV	45
Heuppage	
8087 Chip	\$125
80287 AT Chip (5 Mhz)	219
Kensington Microware	
Masterpiece	\$109
Masterpiece Plus	159
Keytronic KB5151 & Dvorak	
	ee. \$169
Kurta & Kurte Ped w/Styleus	
	\$750
Mouse Systems	
PC Mouse	\$159
Touchstone Technology	
Touchstone II (add-on keypad for IBM)	\$166
Varea Computing	
VerseWriter	\$230

This is only a sample of the nearly 10,000 products we carry. If you're interested in something that is not listed, PLEASE CALL!

And don't forget to ask our sales people about our unadvertised specials.

1 800 826-1589

WITHIN WISCONSIN 1 800 472-3535

INT'L TELEX: 260181 ORYX SYS WAU

Technical Support/Order Status/Customer Service: Call (715) 848-1374.



POLICY:

- Wisconsin residents add 5% for sales tax.
- Minimum \$4.00 for shipping, handling and insurance for orders to \$200.
- For orders over \$200, add 2 1/2% for shipping, handling and insurance.
- For cash payment of orders \$200 or more, add ONLY 2% for shipping, handling and insurance.
- Prices are subject to change without notice.
- All items subject to availability.

PCAD 122485

WE WELCOME:

- Visa, MasterCard and American Express. (No charge for credit cards.)
- Corporate, government, educational volume purchasers, please ask for special accounts desks for additional discount.
- COD (Add \$2.00 per box/parcel. Cash or certified check required.)
- Checks. (Allow 1-2 weeks for clearing.)

INTERNATIONAL POLICY:

We welcome foreign orders. Shipping and handling charges per order are actual shipping costs plus \$5.00 handling fee. Canadian orders - please call. Telex: 260181 ORYX SYS WAU.

WORKING HOURS:

Monday-Friday 8:30-6:00 • Saturday 10:00-2:00 • Central Time

Technical Support/Customer Service/Order Status: Call (715) 848-1374



T.M.

Oryx Micro Supply

CRAFTSMEN OF THE NEW TECHNOLOGY

425 First Street • P.O. Box 1961 • Wausau, Wisconsin 54401

CIRCLE 363 ON READER SERVICE CARD

A Division of Oryx Systems, Inc.

PC: Mart

ATTENTION BERNOULLI BOXERS Give your IOMEGA a Boot!

FIXT/B PLUS for IBM AT, XT, PC and compatibles

FIXT/B PLUS gives you the utility of a bootstrap hard disk while preserving the performance of your formatless file.
Now you have it all
with FIXT/B PLUS!

Golden Bow Systems

IBM AT/XT
Not 15 for sharing
multiple
Cathode raytube add
050000



2300 Sunset Blvd. Suite F
San Jose, CA 95128
(415) 755-6240

CIRCLE 56 ON READER SERVICE CARD

MAINTENANCE AND INSPECTION SYSTEM

A complete computer system for organizing, operating and controlling an effective preventive maintenance planning program in any type of business or industry.

- Maintains job instructions and equipment records
- Weekly or monthly reporting cycle
- Cyclical and irregular scheduling frequencies
- Working reports including work orders, foreman's reports, and requirements reports
- Scheduled/unscheduled work reporting
- Skill and inventory requirements
- Complete work history
- Flexible retrieval and reporting system—operational, planning, and analytical reports
- Full screen input, menu driven, online HELP
- For IBM PC/XT or PC/AT



P.O. BOX 20495 SAN JOSE, CA 95126
(415) 927-7200

CIRCLE 55 ON READER SERVICE CARD

PC SOFTWARE

Public Domain & (User Supported)

- PC WRITE (word processor) **\$800** each
- PC FILE II (data base manager)
- PC-CALC (spreadsheet)
- PC-DIAL (modem communications)
- PC-DBM3 (relational database — 102K)
- PC-DEN LEDGER (business bookkeeping)
- RUS & FINANCE (46 basic business programs)
- FINANCE MGR (macro-videos bookkeeping — 254K)
- PC-OSER II (notebook calendar alarm etc)
- PC-DESKMATE (desktop utilities w/windows)
- ARCADE GAMES (500 packman, pirate, etc)
- PC-PC GAMES (educational, brain games)
- BASIC GAMES (interest w/wing, sword, etc)
- TUTORIAL (Basic — educational)

Try a Six-Pac

any six of the above only \$38.00

(all orders add \$2.00 shipping & handling)
(separate disk and brochure \$3.00 post. paid)

The above programs were developed for the
IBM PC & PC-XT will run on some compatibles
Be certain of compatibility before ordering

Soft Plus Research
P.O. Box 590
Boonville, CA 95415
(707) 895-2210

9:00 a.m. - 4:00 p.m. M-F; Sat. 10:00 a.m. - 1:00 p.m.

CIRCLE 553 ON READER SERVICE CARD



BEYOND 4.77 OVERTHRUSTER™

- Actual 66% speed increase (7.58 Mhz)
- 100% compatible With all software With SpeedSwitch™
- Does not require an expansion slot
- Uses 8088-2 in place of 8088
- Supports 8 Mhz 8087 math chip
- Includes a Reset function omitted on the PC
- Easy to install — no software needed

Price ONLY \$295.00

ALSO — V20 chip increases speed 25% on all CPU operations. Also includes full Z80 instruction set for 8 bit programs on your PC. \$25.95
AT clock crystals 8 to 12 Mhz (39 to 60% speed increase) from \$15.00

Call for Quantity Discounts!

(503) 484-4542

The
System
Works

3088 West 15th, #5
Eugene, OR 97402

CIRCLE 56 ON READER SERVICE CARD

TOSHIBA-IBM COMPATIBILITY P351 P1340 P1351 P1350

Now you can make your Toshiba printer totally compatible with the IBM (and compatibles) in both text and graphic modes. IDT's IBM-Toshiba Printer Interface has Epson emulation with Toshiba quality.

- memory resident software interface
- downloadable font capability for P1340 and P1350
- prints IBM upper ASCII characters
- screen dumps both text and graphics
- Font design capability
- versatility beyond compare!

You can accomplish all this and more for only \$79.95 (\$2.50 shipping & handling). MC VISA

D/T

INTEGRATED DATA TECHNOLOGIES, INC.

4775 Sandhollow Lane Colorado Springs, CO 80917

ORDERS: 303-468-2563

CIRCLE 55 ON READER SERVICE CARD

EASY AIM 30 DAY TRIAL

Installs your programs on a hard disk and creates subdirectories, paths, and displays programs in a menu. all automatically.

FEATURES INCLUDE:

- Time Log
- Backup to floppy or tape
- Copy files to from floppies to from between menu selected directories
- DOS transparent to end user

Powerful Yet Simple \$84.95

ISI ARSON
SYSTEMS, INC.

Computers, Software, Service
R.R. 1 P.O. Box 193
Story City, Iowa 50248
(515) 733-2718

CIRCLE 562 ON READER SERVICE CARD

SPEEDUPS

ZDOS-PC SUPERCHARGER

The software package that really speeds up your PC! Adds the features IBM forgot. Increases display speed 1.3 to 4K! Recall date rolled off the top of the screen. Eliminates flicker on IBM color graphics card. Powerful keyboard enhancer with macros makes function keys and scroll lock work with all programs. Transfers screen output to disk. Onscreen clock, timer & more. Pop up menu controls all functions. In handsome IBM binder with complete documentation. \$34.95

8088 TURBO SPEEDUP CHIP

New HOT 8088 turbochip executes instructions 10-30% faster. High speed design maintains total compatibility yet speeds up ALL programs. 5 minute installation — just plug it in. Adds a powerful extended instruction set. Quickly pays for itself in time saved. \$28.95

MBE

PC PERFORMANCE IS OUR ONLY BUSINESS

SPEEDUPS

AT CRYSTAL KIT

Do it right! The most complete kit available to speed up your AT. A set of 4 quality crystals that from 7.8 to 10.0 Mhz. Allows you to run at the highest speed possible while still maintaining your AT's reliability. Simple installation. \$29.95

FINALLY: QUICK BOOT ROMS

Tired of waiting forever each time you turn on your PC? Just plug in one of our quick boot ROMs. Your PC will boot as soon as you flip the switch! A must for serious PC users. PC Quickboot \$29.95, XT Quickboot \$49.95 Call today.

MBE SYSTEMS

1355 Sunrise Ct.
Los Altos, CA 94022
(415) 967-6100

Immediate
Shipping!

THE PERFORMANCE YOU NEED
AT A PRICE YOU CAN AFFORD

CIRCLE 564 ON READER SERVICE CARD

\$99⁹⁵

GENERIC CADD

SUPPORTS:

- Drawing Layers
- Component Libraries
- 256 Colors
- Full Editing
- User Defined Menus
- User Defined Fonts
- Autocadd Conversion Files Available

CALL TODAY!

1 (800) 228-3601

MC & VISA ACCEPTED

Generic Software Inc.
6 Lake Bellevue Suite 203
Bellevue, Washington 98005
(206) 462-1944

CIRCLE 568 ON READER SERVICE CARD

PC BlueBook

■ ADVERTISING RATES AND INFORMATION:

Standard listings consist of a bold lead line (23 characters maximum); 7 lines of body copy (45 characters per line); 4 lines for company name, address and telephone number; \$200 per insertion—4 issue minimum. Additional charge for extra lines and company logos. Prepayment and frequency discounts available. American Express, MasterCard, Visa accepted. Copy subject to publisher's approval. Send typewritten or printed copy, reproducible logo art (if applicable) and remittance to Kathryn C. Cumberland, Classified Sales Manager, Ziff Davis Publishing Company, One Park Avenue, New York, NY 10016. For additional information, assistance, or to place an order by phone, call collect (212) 503-5115.

ACCESSORIES

FURNITURE

?? UGLY ??

Turn that ugly PC into a beautiful piece of furniture. Solid oak covers for your CPU or monitor handmade by Starbuck Minnikin, professional cabinet makers for over 50 years. \$49.95 each or both for \$89.95. Perfect fit for IBM or Compaq computers. Shipping included. Money refunded if not satisfied. Check, MC, Visa. **STARBUCK MINNIKIN**, 806 Santa Barbara St., Santa Barbara, CA 93105

ACCESSORIES

SUPPLIES

"COMPUTE THE DIFFERENCE"

COMPUTER PAPER—(100% REG BOND)—Stock & Custom

9 1/2" x 11", 15LB, 3000 Sheets/20LB—2600 Sheets \$24.95/\$22.95

14 7/8" x 11", 20LB, 2600 Sheets (Greenbar & White) \$34.95

TOSHIBA P351/Tractor \$1095/\$145

VERBATIM SS/DD \$1.59 ea DS/DD \$1.99 ea

HERCULES COLOR CARD \$164.95

Corporate accounts & Quantity Discounts Available

ARS, INC. Phila., PA 19102

(215) 732-4434 (In PA.) 1-800-321-6456 (Toll Free)

ERGONOMIC STATIC CONTROL

ENSTAT, an effective method of dissipating operator static, consists of a quality adhesive-backed molded strip of conductive plastic with removable connector & sufficient flexible wire to properly ground its keyboard placement in any convenient use \$11.95 + tax + 1.00 ship.

Static make & model B/R HODGES ENT

PO BOX 1806 San Anselmo, CA 94960 (415) 456-3057

LASER PRINTER USERS!

Toner Cartridge Recharge Kit \$99.00 (Instructions & one recharge)
REFILLED CARTRIDGES \$40.00
Call (617) 821-1427 or send orders to PC Corp. 1030 Turnpike St., Canton, MA 02021 (all orders sent UPS collect if not pre-paid)

BAR CODING

BAR CODE/LABEL PRINTING

THE LABEL MAKER™ prints bar codes, OCR-A like and large characters from data entered at keyboard or from disk files. Create and save unique printing formats and record layouts. Performs record add, change, delete, sort and select on disk files. A1 LABELMAKER™ prints AMG shipping/airline identification labels required by Auto Manufacturers. Programs require IBM PC or work-alike. **TJ SOFTWARE INC.** PO Box 2044 Arlington Heights, IL 60006 (312) 364-1065

BAR CODE LABEL PRINTING

PRINTBAR™ is a set of well documented programs written in both BASIC™ and dBASE™. The programs print Code 3 of 9 bar codes from sample data files on disk/ATA and Epson compatible printers. In addition, PRINTBAR™ documentation includes how barcodes work and where to get barcode readers. \$149 plus \$7

Shipping and Handling. C/D Bear Rock Software Company P.O. Box 212 Placerville, CA 95667 (916) 822-4640

BAR CODE—PRINT/READ

PRINT Bar Codes on PC and Epson/Diskette Code 39 for \$49. Code 39, 2d5, UPC-A, & Code 128 with disk data \$129. Subscriptions \$129. AAG-\$299. LOGMARS, HBC-1199 Read above bar codes thru keyboard attachment into any program (Wdsk, Lotus) on PC/XT/AT, no slot, serial port, or power-\$595, includes Code 39 print program. **Data Solutions Systems** 130 Camp Court Santa Cruz, CA 95060 408/458-9938 Visa/MC

BUSINESS OPPORTUNITIES

Personal computer owners CAN EARN \$1,000-\$5,000 MONTHLY

by selling simple services performed by their computer. Work at home—in spare time. Get free list of 100 best services to offer. Write: **C.I.L.O.J.** PO Box 60369 San Diego, CA 92106-6369

COMPUTER/INSURANCE

SAFEMARE

If your computer is important to you, insure it! SAFEMARE provides full replacement of hardware, media and purchased software. As little as \$39 a year covers fire, theft, power surges, earthquakes, water damage and auto accident. Call 8 am to 8 pm Monday thru Friday. Saturday 9 am to 5 pm.

SAFEMARE, THE INSURANCE AGENCY INC. 2650 N. High Street Columbus, OH 43202 (614) 262-5559 (OH), (800) 848-3489 (NAT)

COMPUTER REPAIRS

IBM PC/XT/PPC & COMPAT

PORTABLE REPAIR

Circuit boards and electronic sub-assemblies professionally repaired on ATE (Automatic Test Equipment). An alternate solution, with lower pricing and test turnaround. Dealer & Maintainer packages available. From keyboard to power supplies. Call

UNITRACE 1288 El Camino, Suite 260 San Jose, CA 95131-1575 (408) 946-1090

CONSULTANTS

SYSTEM INTEGRATION

Consulting & system integration for single-multi-user, network & micro/mainframe systems. Services include software & hardware selection, installation, custom design, training, & sales. We specialize in combining products from multiple vendors to provide the best system possible from current technology. **KRAKALI BUSINESS COMPUTER SYSTEMS** 9670 Des Road #204 Des Plaines, Illinois 60016 (312) 292-7695

DATA CONVERSION

FULL SPECTRUM

of Data Conversion services

- Quick Turnaround
- Highly Professional
- Most Conversion Scenarios

Computer System Services, Inc. 5 East 16th Street New York, NY 10003 (212) 242-5255

DON'T REKEY-CONVERT!

We use the latest digit, tape, scanning & telecommunications technology to reform data for you. QUICKLY AND ACCURATELY USUALLY AT ONE TENTH YOUR CURRENT COST. We transfer data between word processors, typesetters, micros, minis, mainframes, & software packages. We supply a full range of consulting services including Data Customization and Database Development.

Data Conversion Laboratory 67-27 168th Street Fresh Meadows, NY 11365 718-339-4921

DISKETTE COPY SERVICE

9 TRACK TAPES to IBM-PC

Convert mailing lists or other main frame data on 1600 BPI 9-track tapes to PC-DOS 5 1/4 diskettes. New automated process guarantees data verification. Easy instructions for loading to your data base (dBase, REXX, etc.) or hard disk. Only \$60 per million chars. \$95 minimum. Bernoulli box \$30/M.

A-S-I Inc. 1289 El Camino, Suite 260 Menlo Park, CA 94025 (415) 323-6338

BLUEBOOK

PERFECT COPIES GUARANTEED

Why risk duplicating your important programs on your computer, when our equipment is designed solely to duplicate disks and verify their perfection 100%? Over 600 formats 3 1/2", 5 1/4", & 8". Plus servation, copy protection, labeling, packaging, shrink-wrapping and last, personalized service.



**Western
Transdata Inc.**
DISK DUPLICATION

WESTERN TRANSDATA INC.
1701 E. Edinger Ave., Building C
Santa Ana, California 92705
(714) 547-3383 (Collect)

HARDWARE

ADD-ON ACCESSORY

HYPERION OWNERS

Are you running out of memory? HyperRAM—Miniature external plug-in module (4M* - 5M* - 7M*) increases the memory to 512K or 840K. Now available! \$250/\$450. Technical Research
63 Wildcombe Hill Blvd., Suite 1103
Weston, Ontario M9R 4B2
(416) 245-1656

HARDWARE

ADD-ON BOARDS

SPEED UP YOUR IBM AT

Our speed kit can accelerate your system from its current speed of 6 mhz to 10 mhz (66% increase) 80 test/utility programs included. Easy instructions, non-technical installation. No soldering involved. 99% success rate. From \$10 to \$49.95. Visa/MC/COD. Call about High Speed 80285, 80287 and other AT enhancements.
MAST AT Enterprises
18045 Cocklebur, Ste. A
Rowland Heights, CA 91748
(818) 810-8443

IEEE 486 CONTROLLERS

The most respected name in GPIB interfaces for microcomputers offers you two IEEE 486 Controllers for IBM compatible Personal Computers. Ziatech's experience guarantees you the best documentation and most efficient software available. Two-year warranty. Call or write for free information packet.



ZIATECH
CORPORATION

Ziatech Corporation
3433 Roberto Court
San Luis Obispo, CA 93401 USA
(805) 541-0488 (T) Telex 4992346

FIXED DISK BIOS/BOOT

FIXT boots from most popular Hard Disks—DAVON, XEBEC, INOMEGA, ST LAKES, etc. Adds XT-like BIOS interface to your disk for PC. Security, multiple volumes, removable media support optional. No-stick plug-in installation. Specify controller and computer with order. \$80-\$180. Add \$3 ship. CA tax.



GOLDEN BOW SYSTEMS
PO BOX 3039
SAN DIEGO, CA 92103
(619) 298-9348

HARDWARE

COMMUNICATIONS

SMART ANSWERING MACHINE

SAM transforms your IBM PC into an intelligent phone answering & real-voice messaging center. FEATURES: 999 personal messages, call screening, message forwarding, timed or grouped message delivery, variable phonebook/autodialer, time/date log, voice prompted remote access. AND MORE!! All hardware & software included. RETAIL PRICE \$295. VISA/MC.



DAILECTRON INC.
2035 California St. #17
Mountain View, CA 94040
(415) 960-3040

HARDWARE

COOLING DEVICES

LESS NOISE! MORE COOLING!

Does your PC sound like a high speed turbine? Does it use expansion cards that create extra heat? Solve your noise & cooling problems with the SILENCER from PC Cooling Systems. Each model utilizes a super quiet, West German, all metal, 4 1/2" fan. Model SQ cools with 84% less noise than the standard fan it replaces! Model HP provides over 100% more cooling! Mounts to existing holes on the back of the IBM PC or XT. Free Shipping \$79.95 - \$45/h VISA/MC/CX.
PC COOLING SYSTEMS
31510 Via Anaral Dr.
Bensall, CA 92003
(619) 723-9513

HARDWARE DISK DRIVES

8 INCH DISKETTE SYSTEM

Read, write, and format diskettes from IBM mainframes, minicomputers, data entry equipment, etc. Complete easy to use software handles EBCDIC conversion. Can read and write CP/M 8-inch diskettes (many formats). You also can use 8-inch drives for PC DOS files. 1200 KB per diskette! \$1150 complete.
MicroTech
644 Emerson St., Suite B
Palo Alto, CA 94301
(415) 324-0114

HARDWARE/ MONITORS

MONITOR HAZARDS SOLUTION

Recent study shows CRT's can be hazardous to your health. Monitors and TV's emit radiation. Protect yourself from bombardment. Our NON-GLARE distortion free, shielding screen is made with LEAD and chemically treated to filter out hazardous rays. Send now: 10" 14" \$29.95, TV's 19" \$35.95, 25" \$42.95 POSTPAD. 30 day Money Back Lifetime Warranty.
RAM
8306 W. Shire Blvd., Suite 10
Beverly Hills, CA 90211
(213) 931-6065

HARDWARE PERIPHERALS

QUICK BOOT YOUR PC!!

FOR IBM PC'S ONLY!! THE PC-INMATE, a Firmware ROM Module for IBM-PC! Features: BOOT within 10 SECONDS!! BREAK THE 640K BARRIER! Access up to 704K of RAM (LOTUS, DOS, F/W etc.) SCREEN RELIEF!—protects your monitor, and MORE!! Easily PLUGS IN-NO SLOTT! Special Introductory Offer: \$49.95 S/H incl. Dr. Inquiries accepted.
JS & J SOFTWARE
1281 S. King St., Suite 6A
Honolulu, HI 96814
OK/MC/VISA/MC

PCjr ADD-ON DRIVES

Upgrade your PCjr with our easy-installed add on drive system. It includes a replacement disk controller (operates up to 3 drives), a 2 drive cable, external 360K drive(s) & software for operating the extra drives. Prerequisite: DOS 2.1 \$295 (one drive), \$449 (2 drives), \$149 (controller only). \$6 shipping.



J & M Systems, Ltd.
15100-A Central SE
Albuquerque, NM 87123
(505) 292-4182

SHARE PC PORTS FOR \$200

SHARE multiple PC's with a printer or a modem. NO MORE manual switches or loss of data. SHARE a terminal with a modem or a printer. NO MORE cable swapping or T-switches. SHARE printers SIMULTANEOUSLY with one PC. Call to learn more about expanding your resources—without inflating your budget.



TIAMAT
P.O. Box 470300 Suite 1113
Tulsa, OK 74145
(918) 627-0891 or 627-7594

HARDWARE POWER PROTECTION

MEIRICK STAND-BY POWER

THE MEIRICK STAND-BY POWER SYSTEM provides back-up power and protection from power failures, brownouts, surges, spikes, and power line noise. The enclosed battery will supply a long run time during a power failure. 240 watt system-\$365. 400 watt system-\$495. 600 watt system-\$795.
MEIRICK INC. POWER SYSTEMS DIVISION
Box 299
Frisco, CO 80443
(303) 668-3251

BLUEBOOK

HARDWARE STORAGE DEVICES

COUPLER FOR 9 TRACK TAPE

Two models available to read and write 1/2 inch magnetic tape with formatted 9 track drives. Runs all speeds and densities in PC, XT and AT running MS-DOS or XENIX. Data transfers up to 504,000 bytes per second. Complete with cable and software, prices start at \$880.

OVERLAND DATA, INC.
5644 Keaney Mesa Rd.
San Diego, CA 92111
(619) 571-5555

MAILING LISTS

MAILING LISTS

Now over 855,000 micro owners. Select by brand 219M Apple, 179M IBM PC, 159M TRS-80, 91M Commodore and more! 9 phone verified reseller lists including 6,211 stores, VAR's chain buying offices, Canadian and more! 25,000 Unix users, 14,000 computer companies. Lists by software brand, printer model, modem owners, investors, educational, etc. Over 75 different micro and mini lists. Call or write for FREE catalog. Include phone and type of business you're in.

ivv Brochur
TARGETED MARKETING INC.
Box 5125
Ridgewood NJ 07051
(201) 445-7196

PUBLICATIONS CATALOGS

EASY WAY TO MASTER DOS!

New handbook shows how, why, and when to use all 44 PC & MS DOS commands quickly and easily! Lively hands-on tutorial makes learning fun, for a change. Covers basic thru advanced topics. All versions up to 3.11! Lots of practical examples. 221 pages only \$15.95 at bookstores, or send check + \$1.00 S&H to:
LITTLE, BROWN & COMPANY PUBLISHERS
200 West Street, Code M-368121
Waltham, MA 02254
1-800-343-9204 (credit cards)

TAPE TO DISK CONVERSION

TAPE TO DISK CONVERSION

Convert any 9 track magnetic tape to or from over 500 formats including 3 1/2", 5 1/4", 8" disk formats and word processors. Formats available include IBM PC, APPLE, Altos, TRS80, CP/M, Display, IBM SYS/37, Macintosh, Wang, LANIER, OS/2 and 500 more. Disk to disk conversions also avail. Call for more info.
PIVAR COMPUTING SERVICES, INC.
47 W. Dorrance Rd.
Wheeling, Illinois 60090
(312) 459-6010

SOFTWARE ACCOUNTING

CUSTOM PAYROLL

All systems support multiple pay categories, calculation of all taxes, user-defined deductions, exceptional item handling, a variety of necessary reports, paychecks and W-2 forms. Written in PC Basic with full source included for easy maintenance. Prices start at \$685.00 for basic system and manual.

DATASMITH, INC.
Box 8036
Shawnee Mission, KS 66208
Phone (913) 361-9118

ARCHITECTS AND ENGINEERS

AEMAS System is designed specifically for architects, civil engineers & other professional firms where monitoring project costs is required. Modules available are job costing, payroll, A/R, A/P, general ledger & automatic invoicing. Interactive modules stand alone or run in any combination. Contact Sales Department.
DATA BASICS, INC.
110300 Cedar Rd #110
Cleveland, OH 44116
(216) 721-3400

THE BUSINESS ACCOUNTANT™

Financial management for the consultant, entrepreneur or small business. Cash or accrual method. Save bookkeeping costs! Features: Departmental accounting • Balance Sheet • P&L • audit trail • double entry, budgeting/graphics • checkwriting & LOTUS 1-2-3 interface. Also for home use. The Accountant DEMOS \$10.



Decision Support Software, Inc.
1300 Vincent Place—Dept. B
McLean, Virginia 22101
(800) 366-2022/(703) 442-7900

GENERAL LEDGER PACKAGE

FINANCE MANAGER II: A personal/small business general ledger system for the IBM PC. Menu driven, easy to use, all major reports, budgets and graphics. We have so much faith in this package we are offering an evaluation copy for only \$7 or a registered copy for \$63.
GENESIS SOFTWARE
P.O. Box 16007
Colorado Springs, CO 80935-0007
(303) 576-5333 MC/VISA/AMEX

PC-FUND

PC-FUND is a fund accounting system for local govts, schools, colleges, and not-for-profit groups. The system includes: General Ledger, Report Writer, P/D/Encumbrance, payables, receivables, payroll/personnel, budgeting, utility billing and fixed assets. The system supports up to 99 funds, 9999 departments and up to 36 fiscal periods are on-line. PC-FUND runs on the IBM PC and most MS-DOS & XENIX computers.
AMERICAN FUNDWARE, INC.
P.O. Box 773028
Steamboat Springs, Colorado 80477
(303) 879-5770

CRYSTAL PAYROLL

Fast and easy to use. Computes wages and taxes in seconds. Prints checks with itemized stubs or stubs only (after the fact). Ten user defined pay types for hourly, salary, dollar, bonus, commission, tips, and piece rate wages, expenses, and ten voluntary deductions including 401Ks. True multiple pay and deduction rates. Allocation to multi-GL acc'ts and depts. Multi company ideal for payroll services. Federal, state and local taxes with flexible employee options. Quarterly and year-end reports. Standard \$395, Restaurant \$595, Construction \$595, Farm \$595. VISA, MC, AMEX. 30 day money back guarantee.
CRYSTAL SOFTWARE
3110 Broadway, Suite 203
Boulder, Colorado 80302
(303) 443-5528

G/L ACCOUNTING POWER

Now, the same financial reporting power used by offices all over the "big G" is available to corporate controllers. AM's DATAWRITE™ Corporate General Ledger gives complete flexibility for custom reports. Field Asset Management and Financial Plan Link to Lotus 1-2-3™ are available too. Nationwide support.



Accountants Microsystems Inc.
3633 136th Place SE
Bellevue, WA 98006
800-426-8201, 206-843-2050

CASH CONTROL! FOR \$35

Check Book & Shorthand™: A personal or business CASH CONTROL system. Uses bank & cash transactions to track income, expenses, & CASH FLOW. Prints checks, expands or income summaries by acct. Info's. Excellent for tax preparation. Fully menu driven. Requires Lotus 1-2-3 (IBM PC) or comp. Add 5/H VISA/MC accepted. Auto Electric.
34643 Allegheny Court, Fremont, CA 94536
(800) 321-0130
National Offices (415) 791-6994 CA.

ACCOUNTING SOLUTIONS

For CPAs and growing businesses. Software for both, with optional link between the two. For CPAs: Client Ledger System, the leading write-up program for CPAs. Reporting passive payroll, more. For small business: Total Accounting System. 12 integrated accounting programs, built-in DBMS, networkable.



S O F T W A R E

TCS Software, Inc.
6100 Hillcroft, Suite 600
Houston, TX 77061
800-231-6454 or (Texas) 800-392-5973

SOFTWARE BUSINESS

TIME ACCOUNTING & BILLING

TABS is designed for use by professionals who bill on the basis of time (attorneys, accountants, etc.) A B.A. approved. Quick-easy entry and edit. TABS is easy to understand and operate. STI's full feature software is currently in use by over 1400 firms nationwide. PC-DOS, MS-DOS, Novell Networks. For details contact:



SOFTWARE TECHNOLOGY, INC.
620 No. 48th, Suite 120
Lincoln, NE 68504
(402) 466-1997

CUSTOMER SUPERBASE \$35

This easy to use powerful menu driven customer info system has helped thousands. Find customers in one-two secs-no sorting. Unlimited number of records & labels per customer. Full screen editing. Mailing labels by zip or name. Passworded protection. Full customer lists. Take memos-recall them later & much more! \$35-call

MAKE LIFE EASY! ASK ABOUT SUPER UTILITIES!

PLACE MANAGEMENT CORP.
50-25 65TH PLACE
WOODSIDE, NY 11377
VISA/MC (718) 651-6700

BLUEBOOK

dBASE II/III SOFTWARE

GENERAL LEDGER (integrates w/ dBASE)	\$99
INVOICE (Billing & A/R)	\$99
SALES ANALYSIS (Works with dBASE)	\$99
JOB COSTING (for Contractors)	\$99
JOB ESTIMATING (Works with Job Costing)	\$99

SOURCE CODE included for dBASE II or III. Requires printer, 2 350K Floppies or Hard Disk.
DATAWARE SYSTEMS—(619) 223-3344
 1152 Alhambra St.
 San Diego, CA 92106
 Master Card-VISA-Check-CCD

HardRunner™

Run Lotus without system distress! This is the authentic HardRunner™ program that allows you to run Lotus and Symphony from your hard disk without the need for a system floppy in the A drive. \$34.95 plus \$5 s&h. For further information see advertiser index listing for Neotradamus.
NOSTRADAMUS
 5320 South 900 East
 Salt Lake City, UT 84121
 (801) 261-0769

PROFESSIONAL TIME/BILLING

Handles 400 clients, 20 partners, 80 job (8-40 hrs of pocket expense) descriptions, 20 areas of practice codes, 1000 hrs or per hour billings, & more. Prints billings, monthly statements, aged receivables, & more. Free telephone support.
\$149 (VISA, M/C, AMEX) Other original software. Call/Write for FREE CATALOG.
MICRO-ART PROGRAMMERS
 173 Birch Avenue
 Cayce, SC 29033
 (803) 995-2329 (24 hour)

BUSINESS FORMS!

Print your business forms using information from PFS: FILE (IBM Filing Assistant) databases or full screen input. Supports automatic date, time and sequential output. Includes clear forms design overlay. Price: \$140 plus \$5 S&H. VISA/MC/Check.
800/338-7905 Orders only
 Vertical Solutions, Inc., P.O.
 Box 5051, Evanston, IL 60204
 (312) 328-3961

BILLING/INVOICES

MANAGEMENT MATE SOFTWARE SERIES BILLING™ was designed with simplicity in mind. Professionals, retailers, and manufacturers, prepare bills or invoices the way you already know how. Produces a professional bill/invoice, daily and monthly summaries, aging reports, monthly statements and more. Does not use time or inventory. \$195 + \$5 s&h \$35 demo disk.
DEPALANTINO/CATARROUS
 22 South Clinton Street
 Doylestown, PA 18091
 (215) 343-4771 (215) 345-0433

SOFTWARE

BUSINESS PROJECT MANAGEMENT

AHA! (408) 458-9119

You found it! The number to call for software to manage any complex project. e.g., R & D, CONSTRUCTION, BUSINESS/VENTURE PLANNING! Demo Sampler-Pack includes: PMS-II, RMS-II, MMS-PI, HARVARD TOTAL PROJECT MANAGER, HORNET, PERT-MASTER, TIME-LINE, SCHEDMA SUPERPROJECT PLUS! Our staff of Project Managers and Microcomputer professionals provide NEEDS ASSESSMENT, SET-UP, TRAINING, INDIVIDUAL CONSULTATION by arrangement!

aha!

AHA! INC. P.O. Box 8405

San Jose, CA 95051-8405 (408) 458-9119
 Project Management SERVICES!

MicroPERT™ 1

Multiproject scheduling for IBM PC, XT, AT & true compatibles. Timescaled Network Diagram, Gantt chart & Cost/Resource histogram on screen or printer. 8 standard reports. Up to 220 subprojects. DIF output. Extensive manual. 1 Year limited warranty. Call/Write for brochure. Price: \$350.00 (Demo \$25.00)
Sheppard Software Company
 4750 P. Clough Creek Road
 Redding, California 96002
 Phone: (916) 222-1553

SCHEDULE GRAPHICS™

Prints custom bar and milestone schedules from Lotus 1-2-3/Symphony input. Features many graphic symbols for representing activity durations and milestones. Easily place text with symbols. Many other features for creating effective schedules. Requires PC/MS-DOS and dot matrix printer. \$59.00 specify printer (CA res add 8%).

SUCCESS SOFTWARE

14252 Culver Drive Suite 408
 Irvine, CA 92714
 (714) 551-6224

SOFTWARE

COMMUNICATIONS

AUTOTALK A NEW STANDARD

AutoTalk is a new release from OPR Software that has the features to make communications a breeze for IBM PC/XT/AT/Compatible. Allows unattended operation, multiple remote calls & multiple file transfers. Menu driven with help screens make your setup & day to day operation easy. Password protection built in. Price \$199.00.



OPR SOFTWARE, INC.
 588 Habitat Center - Rt 70 W
 Bricktown, NJ 08723
 (201) 920-8890

COMPUTER-TELEX-LINK

Link your computer to telex with Cawthon's Computer-Telex-Link. Available for US and overseas applications, Cawthon's Telex-Link is easy to use, has on-line help, self-test diagnostics, frequently called numbers, a complete User's guide, and excellent support. For many computers and operating systems.



**Cawthon
 Scientific
 Group**

24224 Michigan Avenue
 Dearborn, Michigan 48124
 Phone: 313-565-4000

TURBO PASCAL COMMUNICATIONS

Break the AUX port deadlock with our communications procedures for the IBM PC and Hayes compatible modems. Includes assembler load module, sample program, and instructions. You write only your own custom Pascal code. Initialize COM1 or COM2. Fast with full-buffering to avoid missed characters. All source code provided. \$22.00 check or m.o.

ACCELERATED LOGIC, INC.
 108 E. 38th Street, Suite 902
 New York, NY 10016
 1-800-437-5200 ext. 200

WANT FREE SOFTWARE?

bulletin boards have it. VDR-TALK puts it on your disk! Can pay for itself in 10 minutes! On-Line Help, Windowed Menus, Split-Screen viewing/transfer on two port system. Dozens of emulations & MUCH MORE! FAST! FRIENDLY & POWERFUL! For IBM & Compatible w/182K, async & DOS 2.00 & up. Perfect for business! \$195 VISA & M/C (Ohio Residents Add 6%)
VDR-TALK Corp.
 104 6th Ave. (Chaut)
 Mansburg, Ohio 45342

SOFTWARE

DATABASE

DEMOGRAPHIC DATABASE

Nothing-but-the-facts is a general purpose database on 32 diskettes that covers all US counties and most cities. Includes data on agriculture, banking, crime, climate, education, government, housing, income, poverty, vital statistics, and much more. Manual and storage cases included. Ideal for market research. \$285 MC/VISA.
MELISSA DATA CO.
 12 Balboa Cove
 Newport Beach, CA 92663
 714-650-1000

SOFTWARE

DATA ENTRY

SIDES/PC

Replace your 029, 129, 3741/3742, 5280, etc. Versions. Extended keypad to comprehensive, full function for high volume, heavy editing. Features include standard keypad + verify, table lookup, search, insert/delete, format change, select, balance, statistics & much more. Prices start at \$195—30 day free trial.
Software Consulting Service, Inc.
 8550 Founders Drive, Suite 231
 San Antonio, TX 78239
 (512) 656-6848

ROOE/PC DATA ENTRY SYSTEM

ROOE/PC is unmatched for power & ease-of-use. Menu-driven, pop-up help, heads-down speed, extensive input validation, automatic reformatting, conditional processing, operator stats, 029 keyboard option, much more. \$40 demo. \$595 for full license. \$395 each additional. Volume discounts.
OPX INC.
 20823 Stevens Creek Blvd., C-1
 Cupertino, CA 95014
 (408) 973-3292 TELEX 701111

ENTRYPOINT

Most widely installed data entry system for PC/XT/AT. Heads-down speed, sophisticated screen applications. Features paint the screen form design, data validation, table & file lock-ups. Help keys, logic processing, reformatting, batch totals, verification. 129 KB reformatting & more. Demo \$24. Operator \$545. Developer \$845.
DATALEX
 650 5th Street
 San Francisco, CA 94107
 (415) 541-0780, (800) 962-8888

BLUEBOOK

SOFTWARE

DATA MANAGEMENT

PC-FILE III™

Easy to use, and one of the most powerful. All standard features (search, sort, list) plus: browse, global changes, macros, mailing labels, formatted reports with selection and calculations, sub-totals, totals, averages, encryption. Exchange data with 1-2-3, WORD, WordStar, etc. Over 190,000 users. Version 4.0 \$59.95 + \$5 s/h. Check, M/C or VISA. Toll free 24 hrs 1-800-JBUTON. ButonWare, Inc. P.O. Box 5786 Bellevue, WA 98006 (206) 746-4296

PC-FILE/R™

Next generation offspring of PC-File II. All the power of its popular predecessor plus: Relational capabilities, integrated letter writing and mail-merge, context sensitive help windows "pop up" when binary search retrieves data hundreds of times faster. Ask your dealer for it, or order direct from ButonWare \$149.95 + \$5 s/h. Check, M/C or VISA. Toll free 24 hrs 1-800-JBUTON. ButonWare, Inc. P.O. Box 5786 Bellevue, WA 98006 (206) 746-4296

SOFTWARE

DATA TRANSMISSION

TRANSFER/1-2-3®

Easy transfer your selected data direct from your PC files into Lotus or Symphony. Handles numeric or alpha ASCII data. Has automatic spreadsheet creation & reusable file definitions. Order now & get the copy Function Key Loader utility. PC/XT: DOS 2.0 + Only \$9.95 + 2.50 s/h. Call add 6% tax. MC/VISA. Am Exp. company check. SOFTMARK P.O. Box 17065, San Diego, CA 92117 Order: 619/280-2077 (CA) 800/858-0692

SOFTWARE

DEVELOPMENT TOOLS

DEVELOPMENT SOLUTIONS

Use your PC as a complete development system. Cross-assemblers target most popular chip families. Debug with AVSIM full-screen software simulators and TRACE in-circuit emulators. Turn your code into firmware with superior AUPROM EPROM programmers. Available for CP/M-80, CP/M-86, PC/DOS/MSDOS host systems. Priced from \$200. Call for details.

AVOCET SYSTEMS INC.

Avocet Systems Inc.
P.O. Box 490-G
Rockport, ME 04856
(800) 448-8500, (207) 236-9055

dBASE DEVELOPMENT SYSTEM

Professional Development System for dBase II & III w/1.2mb of source, utilities & programs for quick & creative application development. \$195. dBase programmer's editor, utility manager windows let you edit up to 4 command files on screen, complete w/powerful source development features. \$245. GLOBAL TECHNOLOGIES CORP. 16572 E. Louisiana Drive Aurora, CO 80017 (303) 337-7158

TURBOPOWER UTILITIES

Nine Powerful tools for Turbo Pascal users on PC/XT/AT & compatibles—Pretty Printer, Structure Analyzer, Execution Timer & Profiler, Pattern Replacer, File Differencer, Command Repeater & more. See ads in Byte & PC Tech or call 408-378-3672 for more info. DOS disk & 140 pg printed manual. \$55. With source code & theory \$95. Order toll-free at (US) 800-538-8157 a330, (CA) 800-672-3470 a330

TURBO
Power

TurboPower Software
478 W. Hamilton Ave., #156
Campbell, CA 95008

SOFTWARE

DICTIONARY

cheapware®

ASCII list of 3 to 15 letter words stored in random format on a DOS disk. List has 27K words, List II 30K and Word Sleuth 40K. List I has no capital letters. Word Sleuth will print matches to skeleton (like 7pppy). Utility to add, delete or change words and a display function is included. List I-\$20. List II-\$30. Word Sleuth-\$45. Robert L. Nockle 4538 W. Ninth St. St. Louis, MO 63147 800-NODUAL (#42-6520) or 314-621-7618 in Missouri

SOFTWARE

EDIT

LII® Jake

So Long EDLIN! Hello LII! Jake! A Command-Fire Full Screen Editor for IBM PCs and compatibles. A productivity tool for data entry and modification of text files. Fast and functional for the DP professional. Easy to learn for the novice. Comprehensive on-line help facility. \$49.95 + S&H. Finks Mathewson Company P.O. Box 2424 (Open-24) Arlington, Virginia 22202 (703) 684-8284

SOFTWARE

EDUCATIONAL

ABC STATISTICAL SOFTWARE

Basic statistics for the IBM PC and compatibles in an interactive easy-to-use format. Includes data entry system and file utilities. Processes to 230 variables, unlimited cases (limit 101 on one disk). Reads ASCII, SPSS data. \$200 (\$100 non-profit), Demo \$30. Outside US add \$15. Consortium Software Ann Arbor, Michigan 48106-1248

LET YOUR PC PROGRAM YOU

SCC presents our new, experimental BEHAVIOR MODIFICATION PROGRAM, designed to Re-Program the subconscious mind for improvement in the areas of Obesity, Smoking, Alcohol, Drugs, Self Image & Assertion, Pos. Thought or Pos. Sexual Attraction. 80 cks, 54K, DOS 2.1, color or mono. \$19.95 + \$2 S&H. Money order—immediate ship.

THE SERIOUS CYBERNETICS CORPORATION
P.O. BOX 120124—DEPT B
ARLINGTON, TEXAS 76012

SOFTWARE

ENGINEERING

ENG/SCI GRAPHICS

OMNIPLOT(S) (screen graphics) & OMNIPLOT (P) (plotter driver) provide integrated engineering/scientific 2-D & 3-D graphics with NO PROGRAMMING REQUIRED! Menu-driven, flexible, professional. Choice of formats: tabular/line, contour, bar, pie, 3-D wire frame & much more! OMNIPLOT(S) \$195, OMNIPLOT(P) \$195. Both \$295. MICROCOMPATIBLES 301 Prelude Drive Silver Spring, MD 20901 (301) 593-0683

NEW STRUCTURAL DESIGN

Fast, efficient, versatile structural analysis and design program in spreadsheet format—BEAMS, COLUMNS AND FRAMES of any material. Friendly input and output with data storage and COLOR graphics. Specify PC, XT or AT and send \$25 for demonstration diskette to: C-Squared B-Squared Software Design Inc. 763 27th Ave. San Francisco, CA 94121 (415) 751-1332; (800) 621-0851

SIMULATION

GPSS/PC is a full-power version of GPSS, the most popular mainframe simulation language. More than just a language, it is a simulation environment specifically designed for interactive use on today's high-speed microprocessors. Using GPSS/PC, you can predict effects of changes to real-world systems. MINUTE MAN SOFTWARE P.O. Box 171-B Stone, MA 01775 1-800-343-0664 ext. 4800 (U.S.) 1-800-322-1238 ext. 4800 (Mass. only)

ATLAS Tutor &

ATLAS Syntax Verifier

ATLAS Tutor is a menu driven training tool to help engineers learn to generate ATLAS code. ATLAS Syntax Verifier is a development tool to make you more productive off station. The verifier is menu driven and runs in an interactive or a Batch Mode. Both are in accordance with IEEE Standard 796. Price: \$400 each or \$550 for both. Requires 192K for the tutor and 256K for the verifier. DOS 2.0 or later, and two disk drives. DUBERT International, Inc. 8858 Glenhaven St. San Diego, CA 92123 (619) 277-4700

BEAM ANALYSIS & SPRNG. DESIGN

Beam Analysis Prog calculates shear moments, reactions, slopes and deflections in beams. Price: \$50.00. Helical Spring Design Prog for compression, extension and tension springs. Price: \$75.00. Both packages include disk and documentation for IBM PC, PCjr & compatibles & for Apple I series of computers. 48K required. SYLCA CORP. 33-47 14th Street Long Island City, NY 11106

CREATE PC'S EASILY

GRAB some double-sided printed circuit board artwork of up to 12" square using PC-LAYOUT on an IBM-PC. The final artwork, solder mask and silk-screen (Net) is produced using either a printer or a plotter. Price \$145. Demo/Disk/Manual \$45. **GRAND TECHNOLOGY**
7210 Jordan Ave., Suite D50
Canoga Park, CA 91303
(800) 235-6646 ext. 546 (outside CA)
(800) 235-6647 ext. 546 (CA only)

ENG/SCI GRAPHICS PLUS

GRAB some software for managing 2D data on IBM or Rainbow PCs (PRO soon). Contouring, gridding, interpolation, Fourier transforms (no power of 2 req). Large data sets. Screen, printer and plotter support. GRD operations in space and frequency domains. Useful for geoscientists, engineers, surveyors \$400.00. **Machine Algorithms**
1515 - 9th Street
Boulder, CO 80302
(303) 442-1072

V-BELT DRIVE DESIGN

This program will design a V-Belt drive for you. Selects standard components for user defined input. Can also specify non-standard components and build your own constraints into system. Selects between 3V, 5V and 8V systems. Calculates most efficient configuration. \$49.95 \$23.95 MC/VISA. **INTEGRATED DATA TECHNOLOGIES, INC.**
4775 Burchfield Lane
Colorado Springs, CO 80917
ORDERS 303-488-2563

SOFTWARE

ENTERTAINMENT

STAR FLEET I

"I call STAR FLEET I the world's most elaborate star battles game" — Jerry Pournelle, Byte Sept 84. Features full color, music, promotions, Capt. Charles, ray mines, launch probes, rescue ships, repair damage, eliminate intruders, more! 96 pg. manual. Req. 128K PC/PC+, 1 disk, 60 cps, \$49.95 + \$2 s/h. Also for TI PC, SANYO MC 555 (182K), C-64, ATARI. **CYNIGUS** For CC orders
P.O. Box 57825 (800) 622-4070
Webster, TX 77598 (800) 942-7317
(713) 486-4163 (in Illinois)

THREE GREAT CARD GAMES

CASINO BLACKJACK Counter/Tutor teaches card counting and expert plays. **GUN RUMMY** 40 plays a strong game, with regulation rules. **CROSBIE MASTER** plays and teaches, with discard suggestions. Card graphics. All well reviewed. \$35 each, \$60 any two. One-time, 64K, 80 columns. VISA/MC. Free shipping. **MANHATTAN SOFTWARE** For CC orders
P.O. Box 765
Peterborough
NH 03458
Orders Only:
1-800-432-5656
Info/NH orders
603-924-9998

ANTIMATTER 2D

REAL TIME, fast action, arcade game. FULL, 2 DIMENSIONAL MOTION and ROTATION, for 1 or 2 player's ships, and all objects. Head to Head play for 2+ or GRAVITATIONAL effects. Top 100 scores on disk. Kybord/Joysticks. 90 difficulty levels. Practice modes. Game editor. Pause mode. ENX 128K. Unregistered \$33. 198K. **AFRIMAWAY**
P.O. Box 586
Drexel Hill, PA 19026
(215) 449-6875

PET DISKETTE

PET DISKETTE—Just in time for Christmas. A PET-pour of a double-dozen graphics-based *****Games, Overviews and Amusements *****Games, source, unique overlay offer included. For only \$19.95, you just can't lose. Requires PC or clone, 64K, 1 SS or DS drive, graphics adapter. Send OK or money order to: **STROGROUND LTD.**
11314 Overlook N.E.
Albuquerque, NM 87111
(505) 293-0658

AIRSIM-4™ Flight Simulator

Pylon Racer Thrills & challenges of racing air-planes! Color graphics. See your opponent drawn in perspective on screen. Race against yourself or a friend using flight data saved on disk. Optional use 1280 baud modems to race a friend in real time! Demo disk, \$5.00. Pylon Racer: \$44.95 + \$2.00 s/h. VISA/MC.



Mind Systems Corp.,
P.O. Box 506
Northampton, MA 01061
(413) 586-6453

COMPUTER TRIVIA

Over 1680 questions covering TV, Sports, Movies, Presidents, Science, Literature, Music and Geography. Entire game is in the computer—no books, no gameboard, no spelling required! One or two players. Requires 80-character CRT screen (Mono or Color). Send \$29.95 c/h/mo. Dealer inquiries welcome. **WFM ENTERPRISES**
P.O. Box 464
Scotts Plains, NJ 07076
(201) 322-9968

LOS ANGELES ON A DISK

A text and graphics adventure game with a touch of reality. Explore the city while looking for the location of hidden prizes. Includes instructions on how to program in your own city. A thought-provoking adult game for one or two players. **Great Fun! Req.** 128K PC/XT, color graphics adapter. \$39.95
Klymas Engineering
P.O. Box 1668
Simi Valley, CA 93062
(805) 583-1029

CRYPTOGRAM SOLVER

Full featured cryptogram program including built in editor, disk save/load, printer output, help functions. Unique "create your own" feature. 62 page manual. Sample puzzles included. \$29.95 + \$2.00 shipping. GA residents add 4% sales tax. **PREDOMINANT SPECIALTY SOFTWARE**
P.O. Box 6837
Macon, GA 31208

SOFTWARE/

FILE CONVERSION

ASCII to PFS: FILE

PFS FILE (IBM File Aiding) users: Don't rekey! Convert information from ASCII files in a "row and column" (fixed field) format directly into your database. Easy-to-use, pop-up window cross-reference, last. Price \$140 plus \$5 S&H. VISA/MC/CHECK
800/338-7905 Orders only
Verical Solutions, Inc.
P.O. Box 5051, Evanston, IL 60204
312/328-3961

SOFTWARE/

GAMES

3 GAMES FOR MONOCHROME

MONAGE 120 ZETA BASE and 101 MAZE's challenge your address, diabolic predicaments and hazards, amazing graphics and sound effects. **LET'S PLAY BRIDGE** offers 65000 contract deals for novices and intermediate levels. You bid & play against program. IBM PC or equiv., 64 K one drive. \$17 each pp or send for free data. **Technique/Graphic Associates**
809 Gary Avenue
Sunnyvale, CA 94066
(408) 732-1940

PC/VEGAS GAMBLING GAMES

Power, Blackjack, Roulette, Keno, Slots. Exact Vegas odds, includes avertissements to explain your best bets and odds, help windows, cross-game scoring. Graphics not mandatory. Written in C (K&R) Req. 128K PC/VEGAS—\$19. Source, games 16 (90K)—\$39. An excellent way to learn C. **D & H BEAR SOFTWARE**
Box 10793
Marina Del Rey, CA 90295
(213) 374-6358

SOFTWARE

GENERAL

SHOP CHEAP—EAT SMART

"COUPONOMIZER—Save more money with your discount coupons and rebates. 64K. "DIET ANALYZER—Lose those extra pounds! Tracks calories + 23 nutrients. Ideal for menu planning. 128 K. Immediate shipment, 2 week money back incl. \$49.95 + \$2.50 s/h. AmEx, MC, VISA. Call for free brochure. **NATURAL SOFTWARE LTD.**
7 Lake St., STE 7E
White Plains, NY 10603
(800) 626-2511, (914) 761-9329 in NY (collect)

9.95 SOFTWARE

PROFILE converts files for LOTUS import
CHECK personal check writing program
PURGE eliminates duplicate records
LOG document logging and retrieval
FORTRAN subroutine library (write & time) many other programs, call for free catalog or send \$9.95/program - \$2 shipping to 9.95 Software
6300 Wilcoff, Suite 304
Houston, Texas 77081
(713) 271-1060

\$7.00 ... INCLUDING DISK

- IBMPC Light Pen c/w software \$70
- 64K RAM (set of 9) 150s NEC 4146 \$30
- 384K Multi-Function Card c/w FULL RAM \$180
- BARGAINS FOR HARDWARE/ACCESSORIES SOFTWARE
- 2500+ Titles for IBMPC then \$7. APRIL -
- LOTS OF DOCUMENTATIONS, VOLUME DISCOUNTS

State your computer. Each huge catalog. \$1.00 MICRO-WORLD, Dept C1
Towner, P.O. Box 310
Singapore 1232
Republic of Singapore

SOFTWARE

GEOGRAPHICAL

US-ATLAS

Locates 29,000 cities, with graphic display of states. Computes Great-Circle distances. Finds all states with cities of the same name. Locates all towns within a given radius. Shows towns 5 mi. either side of a line 400mi. long. Color graphics or monochrome. IBM-PC/XT/AT 192K DOS 2.0. Send \$39.95 money order or check.



ILLUSTON PC-PROGRAMS
1930 Haystack Dr.
Jefferson City, MO 65101
(314) 653-3417

SOFTWARE GRAPHICS

35mm SLIDE FROM YOUR PC
COMPUTER SLIDE EXPRESS converts graphic files produced on the IBM PC into brilliant 35mm color slides with color resolution 400% better than your monitor. Leave your prints behind. Use high resolution color slides all your next presentation. COMPUTER SLIDE EXPRESS \$69/slide \$30 minimum order
VISUAL HORIZONS
180 Metro Park
Rochester, NY 14623
(716) 424-5300

FORTRAN/PASCAL GRAPHICS
GRAFMATIC (screen graphics) 70 Microsoft/IBM 2.0 FORTRAN/PASCAL, RM-PROF, OR, SS FORTRAN compile subroutines. Prof. graphics power backed up by a 100 pg. user manual. 5 pages in one gen. utility, 2-D interactive, total 2-D plot support, 3-D plots, 3-D solid models (hidden line removal) \$135. H-P/H-Plotter? Try PLOTMATIC, for complete plotter graphics capabilities. Interface with GRAFMATIC \$135. Both \$240
MICROCOMPATIBLES
301 Prekude Drive
Silver Spring, MD 20901
(301) 593-0663

GRAPHIC PRINTER SUPPORT
At last IBM-PC graphics support for your dot matrix printer. Use the PHSic to produce quality B&W or color scaled dot matrix reproductions of your display on your Epson, IBM, Okidata, IDS, Centronics, DEC, Aradex, Data-south, Gemini, TI 850, Ritenour, Toshiba, NEC 8023, or C-10th printers if your printer is not listed, let us know and we will support it. GRAPHICPLUS is now available for all versions of PC or MS-DOS and will operate with IBM, Tech-nar and Hercules graphics boards. \$49.95
JEWELL TECHNOLOGIES, INC.
4302 Southwest Alaska St., Suite 207
Seattle, Washington 98116
(206) 937-1081, 1-800-628-2828 ext. 527

TURBO PASCAL & BASIC
Transfer IBM PC compatible screen or window graphics to your Epson JX-80 color or Epson compatible graphics printer. Gives programmer control of resolution, color, size, & placement. This is not a Pk. Sc. routine, it's A PROGRAMMER'S TOOL. Specify Basic or Turbo, \$55 incl. source & shipping. Include check or money order and address. For info on additional features call or write to:
UNIVERSAL Software Systems, Inc.
PO Box 1091
Stevens Pt., WI 54481-8259
(715) 345-2609

INTERACTIVE FLOWCHARTER

Interactive Easyflow: a full screen graphics program for flow & organization charts. Very powerful. 3 levels of zoom, automatic line routing, automatic text centering, horizontal & vertical scrolling, 18 std. shapes, user defined shapes easily added, full manual. Requires 256K and graphics adapter \$149.95
HavenTree Software Limited
PO Box 1093-F
Thousand Island Park, N.Y. 13692
(613) 542-7720 Ext. 50

PRESENTATION GRAPHICS

Create transparencies, 35mm slides, printer and plotter output with Sound Presentations. Construct organization and flow charts, maps, and floor plans using Sound Presentations' comprehensive libraries and powerful editing features. Enhance and modify Lotus charts and graphs \$250 + \$50 for Lotus connector
Communication Dynamics, Inc.
8532 SW St. Helens
Wilsonville, OR 97070
(503) 682-0651

EXECUTIVE PICTURE SHOW

Stop! Before you take an expensive look at Graphics Painter, PC Paint, ExecuVision, or any other graphics package, shouldn't you take a look at the free-form drawing/presentation graphics packages (that do more)? Give us a call or write us for information about Executive Picture Show and PCcopying \$15 Trial Versions available



EXECUTIVE PICTURE SHOW

PCSOFTWARE
9120 Gramercy Dr., Ste 416
San Diego, CA 92123
(619) 571-0981

SOFTWARE HOBBIES

FAMILY TREE™

Record your family history without forgetting the family budget. Trace 10 generations of ancestors or pet pedigrees. Record birthdays, anniversaries, family info. Totally menu driven. Requires IBM PC or comp., 1 floppy disk, printer, 128K, DOS 2.1 or later. \$59.95 + \$3 shipping—VISA, MC or check.



SYSTEMS CONSULTANTS, INC.
PO Box 37075
Raleigh, NC 27627
800-334-0854 Ext. 508 NC-919-846-1763

SOFTWARE INTEGRATION

BACKBONE™

Give your PC/XT (AT BACKBONE) Customized sets of linked menus with a Menu Processor™. Access any program, batch file, or subprogram with a keyboard. Provides sophisticated structure, and a simple user interface. Ideal hard disk organizer. Supports multiple users. Compact, fast \$39.95 + \$4 s/h. MC/VISA
SYNCHRONY SYSTEMS
4191 San Juan Ave., Jacksonville, FL 32210
ORDERS: 800/237-6360 ext. 314
800/282-1152 ext. 314 (FLA)

SOFTWARE LANGUAGES

BETTERBASIC

- Structured language with BASIC Syntax
- Extensible—Create your own keywords
- Modular—Procedures can be grouped together into library modules for higher productivity
- Utilized full PC memory capacity (640K)
- Full support for graphics, communications, and screen formatting. \$199. 8087 module \$99
Ruhme System \$250, sample \$10
Summit Software Technology, Inc.
PO Box 99 Bolton Park
Wellesley, MA 02157
(617) 233-0729, 1-800-225-5800

CCSM-LOW COST PC MUMPS

Frustrated by limited Basic? Rigged Pascal? CCSM is the most effective & productive programming language! Only \$59.95. Graphics add-on is \$49.95. Features include Full Screen Editor, Virtual Memory, 8087 and BCD Support, Transportable Micro-Mini-Mainframe. Productivity can be increased as much as 300%! Fully documented
GUIDANCE SOFTWARE
PO Box 5362
Kingswood, TX 77325
(800) 257-8052

SOFTWARE MAILING PROGRAMS

MY-T-MAILER™ \$30

Our users love this sturdy menu-driven worker. Screensays say "Terrier" Print labels, 3x5 cards, envelopes, any format. Customer labels with line-by-line printer fonts. Sort, Search & Select with powerful, flexible, easy user-interface. EZ Browse, Edit, & Delete. Print up to 5000 copies of one label. Also PC/XT Reg. 128K, \$30
JOHNSON SOFTWARE COMPANY
POB 16567 Dept 3
Seattle, WA 98116
(206) 935-4861

The Quick Mailer

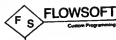
Fast, flexible, menu-driven program designed for organization, club and business mailouts. Easy to insert, update, and delete entries. Use individual or continuous envelopes or labels any size you require! Also, option for storing telephone numbers for easy dialing and printing. Works on graphics (w/ various print styles) or letter quality printer \$27.95
JP Enterprises
PO Box 200771
Austin, Texas 78720-0771
(512) 331-1078

SUPER MAIL™ \$25

This easy to use, powerful menu driven program is used by thousands of happy customers. Find names in 1-2 sec. No sorting. Features unlimited records & labels per name AND full screen editing. Select labels by no or name. Password protection is available. Take memos-recall them later + more! Only \$25.00 VISA/MC
PLACE MANAGEMENT CORP.
50-25 65TH PLACE
WOODSIDE, NEW YORK 11377
(718) 651-6700

FLOWMAIL—\$100

Add, update, delete records. Create/Name separate files. Merge files. Eliminate duplicates. Sort by company name, last name or zip code. List a file in report format. Written in basic. Menu & prompt driven. Very fast and easy to use. Free file conversion & conversion available. Call or Write TODAY for more info!



FLOWSOFT CUSTOM PROGRAMMING
875 Franklin Road #1635
Marettta, GA 30067
(404) 433-3590

SOFTWARE MANUFACTURING

MYTE MYKE™ MANUFACTURING

Control System
Integrates with Business System. Std cost provides 8M of Material, operations routing, where used, same as except & projection capabilities. Inv. Control, Forecast/Sched, MRP, MPP, Prod Cost, Prod Orders, Shop Floor Control. Install & support avail. PC/DOS, MSDOS, MOVELL Networks, XENIX & UNIX
M & D SYSTEMS, INC.
3885 N. Buffalo Rd
PO Box 106
Orchard Park, NY 14127
(716) 662-6611

BLUEBOOK

MCBA MANUFACTURING SYSTEM

Designed to be flexible for use in job shop or repetitive environment. Over 15,000 users. Inventory Management Bill of Materials, Order Processing, Purchasing, Job Costing, Shop Floor Control, MRP Product Costing and Routing, Labor Performance, Accounting MS-DOS, REXX, UNIX. Dealer inquiries accepted. Software available.

MDM SYSTEMS INC

PO Box 792
Southfield, MI 48037-0792
(313) 535-1020

TWIN OAKS mnp2

- Bills/Material
- Inventory Control
- Purchasing
- MRP & CRP
- Master Sched'g
- Phys. Inventory
- Job Costing
- TWIN OAKS, INC.
- Box 136
- Cottage Grove, MN 55016
- (612) 558-1604

SOFTWARE

MEDIA

AUTOMATIC CONSULT LETTERS

Easy-to-use program stores Dr's, R's, plus 2000 bytes text on over 12,000 patients. Data printed as consult letter using any of thirty customized letter templates. Names/addresses of referring doctors stored too. Visits speeds office paperwork, and invaluable aid to clinical research. \$189 U.S. plus shipping.

CMS Software Inc.
4500 Sherbrooke St. West
Westmount, Que. Canada
(514) 989-1806

SOFTWARE

MEDICAL

MEDICAL SYSTEMS WITH ECS

All PPM products have electronic claims submission (ECS) to Medicare & commercial carriers. Super claims too.

- PC • CLAIM \$89.95, claims only
- PC • CLAIM w/ICD's, CPT's & HCPC codes \$229.95
- PC • CLAIM PLUS claims only w/patient file. Complete a claim in one minute \$459
- THRESHOLD • TM \$1,995.00 claims, A/R patient billing
- THRESHOLD \$3,995.00 claims A/R patient billing, complete practice management, statistics, analysis
- CLAIM • NET Nationwide claims clearing house. Full 100% credit on product upgrade
- PC • CLAIM & PC • CLAIM PLUS both feature 30 day money-back guarantee. IBM PC/XT/AT compatibles MS-DOS 256K.

Physicians Practice Management

1910 South Lynnhurst Suite D
Indianapolis, IN 46241
(317) 294-0357
In continental U.S. call (800) 428-3515
Indiana residents call (800) 792-3525

DIFFERENTIAL DIAGNOSIS

THE INTERNIST runs differential diagnoses on any combination of 480 symptoms for 331 diseases. Lists symptoms associated with any disease. Prints & displays diagnoses in rank order. Extremely easy to use and test. Includes binder, user-manual program, and data base diskettes \$95.00 VISA/MC/Check or UPS 0D accepted.
5316 Forest Ridge Rd.
Silverton, OR 97131
(503) 673-5906

PSYCHOLOGIST'S BILLING SYSTEM

PSYCHIATRIST'S BILLING SYSTEM

Features, power, flexibility, easy to learn & use. Try it and see! Print PT STATEMENTS & INS FORMS automatically or in batches. Enter your own fee schedule and diagnoses GROUP or SOLO use. Custom report formatting included. IBM & compatible \$550 Apple \$450
FREE DEMO DISK & PROGRAM DESCRIPTION
Teller, Bailey Associates, Inc.
PO Box 7240, Dept P
Boulder, CO 80306
(303) 258-7258

SOFTWARE

NETWORKING

THE SOFTWARE-DRIVEN LAN

LANMAN™ is a revolutionary, software-driven network that's 1/10 the cost of board-driven LANs. It uses inexpensive serial ports instead of network boards. 99% of PC-DOS software is fully compatible. The \$495 Starter Kit includes network software PLUS cable for both a server and a satellite. Additional satellite modules are only \$195.



THE SOFTWARE LINK, INCORPORATED
8601 Dunwoody Place, Suite 632
Atlanta, GA 30338
CALL 404-996-0700

SOFTWARE

PERSONAL

MEDICAL EXPERT SYSTEM

Sophisticated acute abdominal pain program developed by MD & PhD scientists to assist you & your family in diagnosis of 21 primary medical & surgical conditions based on your symptoms. Be an informed patient. Interesting & unique health care system. \$150 complete with extensive clinical documentation. IBM/PC-compat.
MathelMedics
7315 Granite Road
Melrose Park, PA 19126
(215) 635-6820 or 5820

SOFTWARE

REAL ESTATE

EZ-RE INVESTOR TEMPLATES

Complete analysis package for the Real Estate Investor For Equity Share, Rent House, Apartments, Warehouses, and Office Buildings. Five mortgages can be ARM FHA245, amort, delinquent, or monthly. Ten year projection of cash flow, deductions, sell price, tax at sell, gain or loss per year, and after tax IRR. Expenses, int. rent, and appreciation adjust annually. Also 45 year loan amortization templates. Profit report. Requires LOTUS 123 and 256K. \$50 PPD. Money back guarantee. Visa, MC
LB ASSOCIATES, INC.
6811 Shoke Lane
Vernon, VA 22180
(703) 938-5093

PROPERTY MANAGEMENT

Comprehensive program for managing residential and commercial properties. Many management reports including operating statement, delinquent rent, lease expiration and transaction register report. Provides check writing, check reconciliation, posting of late fees, recurring expenses—\$395. Investment Analysis—\$245.
Yard Systems
3324 State St., Suite "D"
Santa Barbara, CA 93105
805-687-4245

PROPERTY MANAGEMENT PLUS

A new easy-to-use system for single or multi-family properties. Prints, checks, rent statements and commercial properties. Many management reports—late rents, expired leases, vacancies, income/expenses, and operating statement. Includes a bank reconciliation feature and graphics capabilities! Up to 70% reduction in management time. \$775
REALTY SOFTWARE COMPANY
1501 South Pacific Coast Hwy #229
Redondo Beach, CA 90277
(213) 372-9419

SOFTWARE

SECURITY

BITLOCK® SECURITY

Proven effectiveness of powerful multilayered security on IBM PC/XT/AT Compatibles, TRS-80, Apple and Commodore computers using rapid decryption algorithms. Total transparency after easy attachment of small reliable security device to external port. The long term survivor \$49.95/device + software license.
MICROCOMPUTER APPLICATIONS
7805 S. Windmere Circle
Littleton, CO 80120
(303) 798-7683 or 922-6140

XT DATA SECURITY SYSTEM

MagLock secures any type of file and restricts their use to authorized persons. Used with IBM XT or PC with expansion chassis, or any other IBM compatible hard disk system. Secure files, directories, subdirectories or an entire 10 megabyte drive, in minutes, without hardware or operating system modifications. Allows unlimited password selection. Price \$89.00

MagLock

DATA SECURITY SYSTEM

FINDER SOFTWARE LABORATORIES

169 Burnside
Tarrytown, New York 14150
(716) 693-0584

SECURE AT/XT/PC

Control system access, data access. FXT/PC, Control system boot for most popular XT/PC hard disk controllers. Virtuals for AT and XT-compatible. 40 controllers segments hard disk by volumes, controls access with passwords, supports hard disk expansion \$80-\$130 + \$3 ship. plus CA tax



GOLDEN BOW SYSTEMS

PO BOX 3039
SAN DIEGO, CA 92103
619-298-9340

ADVANCED COPY PROTECTION

The world's leading software manufacturers depend on Softguard copy protection systems. Now Softguard introduces the SUPERLOCK KIT—a complete software duplication and copy protection system for your IBM PC. SUPERLOCK protection stops all copyists, features full HARD DISK support, requires no special media, no source code changes, and supports over 30 compatibles. FREE demo diskette available.

SOFTGUARD

SYSTEMS, INCORPORATED

Softguard Systems, Inc.
2840 San Tomas Express, Suite 201
Santa Clara, CA 95051
(408) 970-9340

SOFTWARE SORT

OPT-TECH SORT/MERGE

Extremely fast Sort/Merge program for the IBM PC, XT, AT. Can sort or merge multiple files containing fixed or variable length records. Run as a DOS command or call as a subroutine, plus many other features. Now also sorts BTRVE and dBASE II files! Compare before you buy any other. Write or call for more info. \$99
OPT-TECH DATA PROCESSING
PO Box 678
Zephyr Cove, NV 89448
(702) 588-3737

SOFTWARE SPREADSHEETS

PC-CALC™

This spreadsheet has it all at a popular price. 64 columns x 256 rows, math and stat. functions, horizontal bar graphs, title locking, individually adjustable column widths. If THEN, link to other spreadsheets or PC-File databases, much more. Version 3.0 requires 256K PC. \$59.95 + s/h. Check, M/C or VISA. Toll free 24 hrs: 1-800-JUBITION
Burrton/Inc.
PO Box 5786
Bellevue, WA 98006
(206) 746-4296

SOFTWARE STATISTICS

SIGSTAT

SIGSTAT includes over 70 programs of the BMD statistical series, plus many advanced new features. Mainframe capacity (up to 80 var) for univariate (e.g., ANOVA, regression) or multivariate (e.g., canonical, factor) analyses, time-series, multivariate scaling, regression, plots, q/t and more. 8087 support. \$25K. DOS, \$595
SIGNIFICANT STATISTICS
3336 N. Canyon Road
Provo, UT 84604
(801) 377-4860

RATS Statistical Package

RATS brings powerful and inexpensive statistical and econometric computing to the PC. It is a fast, accurate package that performs regression analysis, time-series forecasting, including Box-Jenkins, and cross-section analysis, including logit and probit. RATS can read data in many formats, including Lotus 1-2-3 files. RATS also offers programming features that provide maximum flexibility and power. Spectral analyses and graphics are available as options. Requires 256K RAM. IBM or compatible. Base program \$200. Demo including 300 page manual. \$40. M/C, VISA

VAR Econometrics
134 Prospect Ave. S.
Minneapolis, MN 55419
(612) 822-9690

GOODNESS-OF-FIT™

Build regression models. Contains linear, non-linear, stepwise, probit, principal components and collinearity diagnostics. Superb data manager to enter, edit, print, merge, reformat and transform data. Guaranteed easy to learn and use. Fast, accurate and versatile. Output is clear, concise and comprehensive. Includes well written instruction manual. For complete information call: 1-800-328-4937.

Goodness-of-Fit™

WALONICK ASSOCIATES
6500 Nicollet Ave. So.
Minneapolis, MN 55423
(612) 866-9022

THE SURVEY SYSTEM

An easy-to-use, menu driven system for the entry, editing, processing and presentation of questionnaire data. The system can produce cross-tabs and scores in banner format, statistic and bar charts. Tables and charts are camera-ready for professional presentation. Card readers and open-end coding/analysis options available.

CREATIVE RESEARCH SYSTEMS
1649 Deloit Dr. Dept P
Petaluma, CA 94952
(707) 765-1001

FORECAST PLUS™

Powerful management tool. Cuts risks in decision-making for economists, scientist, managers... anyone responsible for business planning. Has Box-Jenkins, decomposition, regression, exponential smoothing and many other techniques. Plus comprehensive explanatory graphics and easy-to-use data manager. Many automatic features. Makes statistical forecasting easy for the non-statistician. For complete information call: 1-800-328-4937.

Forecast Plus™

WALONICK ASSOCIATES
6500 Nicollet Ave. So.
Minneapolis, MN 55423
(612) 866-9022

STATPAC™

The professionals' statistical analysis package. Easy-to-use. Comprehensive, inexpensive. Proven by business, industry, education, laboratory, healthcare, finance and government for over 5 years. Top rated manual and technical support. New update. Absolutely the best statistical micro package available. For complete information call: 1-800-328-4937.

StatPac™

WALONICK ASSOCIATES
6500 Nicollet Ave. So.
Minneapolis, MN 55423
(612) 866-9022

\$79—STATISTICAL SYSTEM

Menu-driven. Includes multiple regression, ANOVA (4-way, repeated measures, covariance) Nonparametrics, discriminant, factor, t-tests. Forecasting, Cross tabs, plots. Much more. NCSS-79
865 East 400 North
Kaysville, UT 84037
(801) 946-0445

SOFTWARE STOCK ANALYSIS

WALL STREET WIZARD

The ultimate stock market adventure! Wall Street Wizard is not only a stock market simulation, but an adventure for those just learning as well as the experienced trader. GIVE YOUR MARKET SKILLS THE TEST. Dealer inquiries invited.



crystaldata

crystaldata
PO Box 11064
Huntsville, AL 35814-1064
1-800-523-6122

SOFTWARE TAXES

TURBO TAX™

"Very easy to use. Documentation—Excellent!" —PC Magazine. Powerful and FAST! 30 forms plus multiples. 3 seconds to calculate including all cross-references. Pop-up menus. IRS approved 1986 tax rates and planning module included. Many extras. Professional version adds 7 forms, built-in database, batch output, client letter, 70% billing and more. Simply the best at any price! Personal \$65. Professional \$195.

Integrated state returns for most states \$30/\$100
ChpSoft, Inc.
5674 Honors
San Diego, CA 92122
(619) 453-8722

INFO-TAX™ 85

Professional, menu driven, tax preparation & planning software. 52 integrated Forms, Schedules, W-2s. FASTEST TAX PACKAGE AVAILABLE! Tax Planner. Use overlays, prepared, or computer generated IRS approved forms. Integrated DC/ILL/MD/NJ/PA/WA modules. \$250. INDIVIDUAL Ver only \$65. DEMO \$10. AMEX/VISA/MC. Res. 256K
CRS, Inc.
5712 Magic Mountain Drive
Rockville, MD 20852
(800) 622-4070, (800) 942-7317 in AL.

IBM PC LOTUS TAX TEMPLATES

1985 1-2-3/Symphony Tax Templates. Option 1: 1040, A-E, G, R, SE, W, 2106, 2440, 3460, 4562, 5695, 256K/384K, \$20. Option 2: Above plus F: 320K, 3103, 4136, 4684, 4835, 4862, 4972, 6251: 320K/448K, \$25. Professional: 32 forms and all above, 384K/512K, \$50. IRS Accept. Menu driven. VISA/MC
SPRINK-TAX
1345 SW CRESMER DR
TIGARD, OR 97224
(503) 655-2743

SOFTWARE TERMINAL EMULATION

MicroGate BSC EMULATION

Our MicroGate family offers complete BSC emulation. MicroGate/WS provides both remote 3270 & RJE links. MicroGate II is a programable BSC subsystem to COBOL, C, BASIC, etc.; MicroGate 2780/3780 is now the standard to which other PC RJE links are compared all come with our unequalled customer support.
GATEWAY MICROSYSTEMS
9501 Capital of Texas Highway, Suite 105
Austin, TX 78759
512-345-7791

BARR/HASP INTELLIGENT RJE WORKSTATION

Bundled hardware and software for IBM PC, XT and AT. Transmits data to host and receives output simultaneously. Emulates IBM 3177-2 and HASP on IBM 360/30. Line speed 1200 to 19200 Baud (56 KB on AT). Supports multiple high-speed printers beyond 2400 ipm (7000 ipm on AT). Features: menu-driven, printer forms control, plotter support, unattended operation, easy installation. \$2950 complete.
BARR SYSTEMS, INC.
Suite M, 2830 NW 41st Street
Gainesville, FL 32605
(800)-BARR-SYS/(904) 371-3050

SOFTWARE TRAINING

YOUR KEYBOARD GOTCHA?

Don't miss the benefits of Dorak's another day. Sure. Stroke/Dorak gives you sophisticated keyboard translator for DOS applications, super Dorak typing Coach, self-motivation audio cassette, transfer letters, keytop puffer, manual. \$95.00 plus \$4.00 shipping. VISA/MC, AMEX, check. You can stroke the Dorak today! Seasonal Systems, Inc.
Box 3720
Chapel Hill, NC 27515
(800) 334-5531 (919) 732-9091

SOFTWARE TYPESETTING

HIGH-TECH TYPESETTING

Transmit your text via toll-free lines directly to our fully automated typesetting system. Set per K characters with a \$5 minimum. Same day service. 200 typesets in sizes up to 72 point. Send \$15 + \$3 shipping for our 220 page guidebook, or call toll free and use your MC, VISA or AMEX.

INTERGRAPHICS INC.
1064 South Columbus Street
Alexandria, VA 22314
(800) 368-3342 or (703) 683-0414 in DC area

SOFTWARE UTILITIES

PAOLOK/PAOLOK II DISKS

PAOLOK launches the user with a method for providing protection against unauthorized duplication from DOS commands. PAOLOK II disks come preformatted with longer print and serialization. PAOLOK II disks offer superior protection. Ask about our PRIVATE TALK product. All work with hard disk, EXE/COM files and all DOS versions. MC/VISA
GLANCED ENGINEERING
3520 Ridge Ave.
Arlington, VA 22204
(312) 382-2892

SCREEN MANAGEMENT SYSTEMS

SMS is simply the best utility available for designing, using, and saving color/monochrome screens. GOSUBS are supplied in BASIC to input, output, and edit screen data fields. Loads of extra features. We have been in business 15 years, winning many awards for programming excellence. Price \$195, demo \$50. Manual \$10 VISA/MC, PC/XT/PCjr/PS/2/386/486/1 Disk.

DNA SYSTEMS, INC.
PO Box 1424
Saginaw, MI 48605
(517) 793-0185

COPY II PC

Copy II PC is the backup insurance you need to protect your software investment. Copy II PC makes floppy backups of most protected software quickly & easily and even allows several to be run from a hard disk without a floppy in A! (Call for current list) For IBM PC, XT, AT, 286, V. Also available for Apple II, Mac, C64. \$39.95 - \$3.95 VISA/MC/check.

**Central Point
Software**
CENTRAL POINT SOFTWARE

CENTRAL POINT SOFTWARE, INC.
9700 SW Capital Hwy. #100B
Portland, OR 97219
(503) 244-5762

HP LaserJet Setup Utility

SETUP is a simple menu-driven and/or batch utility that allows full control over your HP LaserJet printer. Supports 7 font cartridges. Control margins, number of copies, lines per inch, lines per page, etc. Over 125 commands. Only \$49.95 + \$4 S/H. CHECK/VISA/MC. NEW NETWORK compatible.



ORBIT ENTERPRISES INC.
PO Box 2875-M
Glen Ellyn, IL 60138
(312) 496-3405

IBM USES CPM DISKS II

Uniform lets you run CPM disks in your IBM 8 or 16 bit systems without any DOS 2.0 program. Read and write to the CPM disk directly or convert files to IBM format. Over 70 formats, also 8" and 96 TPI IBM PC, XT, AT. Call for details. Next day shipping. Dealers invited \$59.95 + \$5 S/H. No PO's. Uniform by Micro Solutions
65 LEE HIGHWAY PUBLISHING CO.
1108 South Second St.
Duluth, IL 60115
(815) 756-2355

dBASE MULTI-USER UTILITY

dBase is a program that locks and unlocks both records and files for dBase II/III to create a pseudo multi-user environment. The locking commands are in dBase source code and are written into the program. Complete with diskette and technical help manual. ONLY \$99.95 - \$149.

MANHET TEN INTERNATIONAL INC.

One Essex Street
Hackensack, NJ 07601
(201) 646-0225

SUNRAY "TIMESAVER 10"

Convert WordStar, Multimate, WordStar 2000 & OfficeWriter files to ASCII character files. Removes all WP codes and soft CR. New files can be used by typesetting equip., other WP programs, host computers or bulletin board. Includes a Hex search and replace utility. Single user \$39.95 - \$2 S/H - 10 user \$150.00.

SUNRAY SALES INC.

1112A East First St
Flt. Worth, TX 76102
(817) 338-1217

PRINTERWINDOW™

Printer utilities for IBM PC & Compatibles
•Pop-up, memory resident printer control
•Epson & IBM printer emulation
•Multi-size screen dumps, test formatting
•Print editor, Wordstar installation & more.
Packages available for NEC, CITIZEN, OKIDATA, EPSON and other popular dot matrix printers. Info & demo disks available. \$49 VISA/MC accepted
Courtin Enterprises, Inc.
PO Box 231190
San Diego, CA 92123
(619) 569-6308

PROGRAM POWER!

Write better programs with Complete Super Utilities™ by PMC Macrocs, windows, backup, recover files, find files last, hide, encrypt & decrypt files. Password & copy protection, DOS commands for dBase, graphs & much more! Over 75 programs + our fantastic manual for only \$69. Call for all the details. VISA/MC
SPACE MANAGEMENT CORP.
90-25 65th Place
Woodside, NY 11377
(718) 651-6700

COPY PROTECTION BY MSO

The ULTIMATE diskette copy protection system designed for software developers and publishers. All IBM PC and XT environments are supported which includes DOS, BASIC (compiled and interpreted), Pascal, P-System, dBASE II and stand-alone systems. Customized systems available. Requires 64K, two disk drives
MICRO SOFTWARE DEVELOPERS, INC.
214 W. West Main St.
St. Charles, IL 60174
(312) 377-6151

DOS PATH COMMAND for DATA

Now Lotus, dBase, Wordstar, etc. can access data files no matter where they're located. DPATH - works like DOS PATH command - up to 128 dirs can be searched. Handles output files, file closing and virtual disk tool. Wordcards OK. Transparent. Requires only 4K. MS-DOS 2/3 \$45 - \$5 S/H MD and 5% VISA/MC/PO/Check.
Personal Business Solutions
PO Box 757 Dept. E
Frederick, MD 21701
(301) 865-3376

IGIGION EDIT PACKAGE

Create/edit/print text using full IBM char. set. Create special fonts with new symbols. Great for foreign languages, forms creations and preparations. View on screen as printed. Simple editing functions & fonts included, or create your own. Epson (or compatible) printer, 128K. \$49.95 (PA - 6%)
Digital Concepts, Inc.
POB 8345 Dept. B
Pittsburgh, PA 15216
(412) 823-8314

DOS-HELPER ONLY \$29

ON-LINE HELP system that eliminates most references to the DOS manual. •Both standard & MEMORY RESIDENT versions included. •Complete, clear info for all DOS & Debug commands & most topics in the manual. •Easy add YOUR OWN help files. •For PC, XT, AT & comp. 2.00 & up. •30 day MONEY BACK GUARANTEE! •\$29 + \$3.50 CA. VISA, MC.
ARISTO SOFTWARE
16811 El Camino Real #213
Houston, TX 77053
800-BARISTO, 713-480-6288

"WINDOWING FOR "dBASE III"

"dWINDOW" is a unique utility program (8K) that dramatically enhances the screen presentations of "dBASE" by patching itself into memory and adding a series of new commands and functions to the dBase repertoire. Using these commands, the user can quickly and easily develop menu-driven programs, create on-line look-ups, or simply source up their "dBASE" menu and data entry screens. "dWINDOW" is a program that is absolutely magic and dazzling, not to mention down right fun," says Data Based Advisor. Requires DOS version 2.0 or above and IBM, PC, XT, AT or compatible. Cost \$99.00 plus shipping.

LIBERTY BELL
SOFTWARE

Liberty Bell Publishing
619 N.W. Gleason, Suite 203
Portland, Oregon 97209
Toll Free: 800-547-3000 (Dept. 606)

FANSI-CONSOLE™

INTEGRATED CONSOLE UTILITY: speed up screen, scroll, read, more typesettable, auto-drawable screen, no scroll blank some adapters, more X3 64 than ANSI, SYS, VT 100/52 keys, windows, keyboard breaks & macros. Recently reviewed in LOTUS "June 85 pg 8", Shawware disk \$25, or disk & 325 p manual \$50 (MI - 4%) MC/VISA
Honey Memo Consulting, Inc.
Box 8275
Ann Arbor, MI 48107
313-994-3259

askSam

A simple-yet powerful-end user text oriented dBase. Retrieve on any combo of words, parts of words and/or held values. Sort output to printer, screen or disk. Update with full screen text editor or batch operators. For IBM PC, PCjr, AT, XT & compatibles with PC-DOS 2.0 or later. 128K min. \$149.95 + \$5 S/H, VISA/MC



Seaside Software
583 Paradise Drive
Conch Christi, TX 78412
512-991-2019 or 1-800-AskSam

Hard Disk DIRECT ACCESS™

The ULTIMATE utility for any hard disk use. DIRECT ACCESS is a powerful hard disk management tool. Organizes your software programs into a "user defined" menu system. Features attractive screen display, rapid access into an application using a simple keystroke & easy to learn. Also handles batch files & complicated DOS commands. Order today. Only \$39.95 + \$5.00 shipping. MC/VISA.



DELTA TECHNOLOGY

DELTA TECHNOLOGY INTERNATIONAL, INC.
PO Box 1104
Eau Claire, WI 54702
(715) 832-0958

SCROLL AND RECALL

A resident screen and keyboard enhancement utility. It captures the data that goes off the top of your display screen and allows you to scroll back through this data or save it to a disk file. Also saves your DOS commands as you enter them and allows you to recall, edit and re-enter previous commands without retyping. \$69. OPT-TECH DATA PROCESSING
PO Box 676
Zephyr Cove, NV 89448
(702) 598-3737

AT/XT/PC HARD DISK EXPANSION

Replace hard disk with a bigger one, or add a second drive! Virtually supports high-capacity drives on standard AT, XT, and compatible hard disk controllers. Includes multiple volumes, security features, selectable clusters, keyboard lock. \$80-\$120 + \$3 shipping + CA tax.



GOLDEN BOW SYSTEMS
PO Box 3039
SAN DIEGO, CA 92103
(619) 296-9349

CO-RES PRINTER UTILITY

Sprinter Features: Co-resident, uses 8 k, issues printer set-up commands for dot matrix printers from keyboard. Pop-up menu selection. Sends line feed, form feed, compressed print etc. with one keystroke. Up to 40 commands. Supports most printers. No copy protection. Visa/MC No COD's \$19.95 + \$2.00 S/H
T.A.G.
(805) 569-2269
3463 State St #342
Santa Barbara, CA 93105

PEEK'S 'N' POKES... and more!

Thousands of programmers enhance their programs and save time with PEEK'S 'N' POKES! The disk (\$6 programs) & manual show you how to access and modify system status, perform DOS & BIOS function calls from BASIC or Pascal, and much more for only \$30. Want more? A perfect companion package, THE INSIDE TRACK, gives your programs assembler-assisted speed plus control over the keyboard, memory, programs, etc. disk (\$61 programs) & manual for just \$45. Shipping \$2.50/order MC/VISA.
DATA BASE DECISIONS
14 Bonnie Lane
Atlanta, GA 30328
(404) 256-3860 (800) 722-7006

SMARTWARE International, Inc. introduces:

- DISK MANAGEMENT FACILITY (DMF) including
 - FILE SPLITTING FACILITY (FSF)
 - Cosmetically appealing display of up to 24 files at a time.
 - Single character entries to perform the following:
 - Erase multiple files (up to 24 at a time).
 - Unerase multiple files (up to 24 at a time) previously erased with this facility.
 - Erase a complete directory of files and/or disk.
 - Change file attributes.
 - Type ASCII files to the screen.
 - Select a directory for display.
 - Browse files with update capability-view ASCII & HEX data (including hidden & system files).
 - Dump viewed files to print w/range selection in an easy to read functional format.
 - Run EXE, COM, & BAT files.
 - Execute DOS commands.
 - Rename, move or copy up to 14 files at a time, placing each in a different subdirectory or drive if desired.
 - An extremely functional tool for users and technical personnel alike.
 - A true value \$49.95 (for both facilities) or priced separately at \$39.95 each MC/VISA.
- SMARTWARE International, Inc.
759 Avery Street
South Windsor, CT 06094
(203) 646-2816

UTILIZE THIS SPACE!

Consult PC Blue Book every issue for easy reference to services/hardware/software. You can be part of PC Blue Book for 4 issues for only \$1,000. You get 7 lines of copy, PLUS a boldface heading, PLUS 4 lines for your name, address, and phone number. Logo art \$640 additional. Reach out to the largest market of IBM PC owners and users TODAY! Call Kathryn Cumberlander collect today.
PC BLUE BOOK
1 Park Avenue
New York, NY 10016
(212) 503-5115 collect

SOFTWARE

WORD PROCESSING

PC-WRITE™ TRY IT \$10

Fast, friendly, flexible. Features: mail merge, end-note, tables/contents, footnotes, keyboard macros, windows. Help screen, manual, quick ref card. Try disk with manual and software \$10. Register for support, updates, and newsletters \$75. Shareware: legal to copy and share with others. Visalinc
Quickpak
219 First North #224e
Seattle, WA 98109
(206) 282-0452

MY WORD! IS JUST \$35

Emulates w/ full featured, full screen word processor for IBM PC/XT/AT or compatibles. Wordwrap, search/replace, block ops, headers & footers, sort, auto row/column, calculator, macros, merge/print, quick print, 256 CHARS. Allows color & customizing 100+ ops, won't lose text, utilities, translate w/ files to ASCII or back. Help screen, printed manual (index/table of contents), fully supported. Source add \$35. DOS 11-3.0, 128K, 1 drive, use any printer, 30 day money-back guarantee!
T.N.T. SOFTWARE INC.
34069 Hansenville Road
Round Lake, IL 60073
(312) 223-0832

CHECK YOUR SPELLING AS YOU TYPE!

The Resident Speller™ sounds like bell when you type an incorrect word. Works with most word processors. Turn on or off checking and add words to an alternate list with the touch of a key. Requires 90K in addition to word processor with 49,000 word dictionary. The Resident Speller™ \$99, demo disk \$2.
SAK TECHNOLOGY INC. DEPT O
4610 Spotted Oak Woods
San Antonio, TX 78249
(512) 492-3394

WORD FINDER™

IMPROVE YOUR WRITING BY FINDING THE PERFECT WORD FAST!

An electronic thesaurus, Word Finder allows users an instant view of synonyms in a pop-up window (RAM resident, like Siskelot) for immediate word replacement with a simple keystroke. Contains 90,000 synonyms for 9,000 words. You may change word processors as many times as required, from any of the following: WordStar 3.0 to 3.31, WordStar 2000, Multimate, Word Perfect, Pto Write, Microsoft Word, IBM Writing Assistant and Easy Writer II, more to follow. Compatible with IBM PC and compatibles and CP/M based computers. Order today at our introductory price of \$79.95 and save a bundle off the regular price of \$124.95.



WRITING CONSULTANTS

300 Main St. Suite 438
E. Rochester, NY 14446
1-800-826-6293
(716) 377-0130 (in New York State)

PC-TYPE™

The easy-to-learn, easy-to-use word processor. Written entirely in Assembler, it's fast, compact, & capable. Help panels, hands-on tutorial program, macros, multiple line headings & footings, DOS path support, print spooling, block operations, much more. Uses ASCII files. Install program allows customization \$59.95 + \$5 s/h. Check MC/C or VISA. Toll free 24 hrs 1-800-BUTTON.
ButtonWare, Inc.
PO Box 5786
Bellevue, WA 98006
(206) 746-4296

FORMATH™ TEXT-FORMATTER

For technical texts. Sizes & places equations, matrices, tables, integrals, big symbols, footnotes, Macros, multiple fonts, 156 Greek/math symbols. Automatic hyphenation, section/equation/reference numbering, indexes, table of contents. Dot matrix, daisy-wheel, laser printers, plam/graphics monitors. \$400. \$50 for demo.



SHANTHA SOFTWARE, INC.

50 West 57th St. Room 11N
New York City 10025
212-222-7647
Touch-tone toll-free: 950-1088-wal-FORMATH



GET FREE INFORMATION!

Of all the products advertised in this issue of PC Magazine, there are dozens you'd probably like to know more about. Handfuls you might be interested in buying.

Now you can have pertinent, comprehensive information about these products right at your fingertips, and it won't cost you anything. Only a minute of your time.

The manufacturers and distributors of these products have colorful and informative literature available. If you're interested in receiving these brochures, PC's Reader Service Program can help.

Simply follow the instructions described below and PC will forward your requests for information to the appropriate advertisers. Before you know it, you'll have a complete and handy product reference file.

While you are looking through PC Magazine take advantage of this handy flip-open card to

circle the numbers as you see products that interest you.

Getting free information about products advertised or mentioned in this issue of PC is as easy as 1-2-3.

1. Each ad in the magazine includes a reader service number. (These numbers are repeated on the advertiser index, as well.) If you'd like more information about the product or products described in a particular ad or feature, circle the corresponding number on the attached card.
2. Fill in your name and address in the space provided. Please: only one card per person.
3. Mail the card today...it's postage paid. And watch your information file begin to grow.

NOTE: This card is to be used for product information or subscriptions only. Editorial inquiries should be directed to PC Magazine, One Park Avenue, New York, NY 10006.

Now is also an ideal time to become a PC subscriber. See the back of this card for details about our special offer for new subscribers.



**IF YOU ARE A
PROFESSIONAL PC
USER...**

**IF YOU SEE THE
PC AS AN INVESTMENT
OR IMPORTANT
BUSINESS TOOL...**

**IF YOU WANT TO
MAXIMIZE YOUR PC
PRODUCTIVITY...**

**HERE IS A SPECIAL
OFFER YOU WON'T WANT
TO MISS!**

Now you can receive one year (22 issues) of PC Magazine for only \$22.00—save 66% off the single copy price!

The money PC will help you save will cover the cost of your subscription more than ten times over!

How?

In PC Magazine, you'll find in-depth and thorough product reviews that will help you make informed and appropriate buying decisions.

You'll learn about innovative applications... project management, communications and graphics... and how to put them to use on your PC.

You'll hear industry news first-hand, and how forward-thinking professionals are using their PCs to further their business goals.

What's more, you get all this information every two weeks, giving you a decided edge over colleagues who rely on a monthly publication.

Your subscription to PC is your guarantee of the most up-to-date and comprehensive coverage of innovations and applications that will help you maximize the performance of your PC.

So don't miss out. Act now on PC's special offer and get one year (22 issues) for only \$22.00. Fill out the attached reader service card and check the subscription box. Or, call toll free, 1-800-852-5200.



This ad is not a misprint.



Electronically, it goes IBM one better by improving expandability with extra power and building in the otherwise optional parallel port and serial communication ports...adding immensely to the usefulness of the factory-original product.

—PC WEEK

Tava Sprite 640K
Serial & Parallel Ports
8 mhz Turbo Processor
20 Megabyte Hard Disk
5 Expansion Ports
RGB or Mono Card
Green or Amber Monitor*
135 Watt Power Supply

\$1995

If you act before January 31, 1986 you can get all of the above for \$1995.00.

No, the price is not a misprint and yes, we are still in command of our mental faculties.

To take advantage of this offer, please call 1-800-TAVA-USA (In California call 714-261-0211) by January 31, 1986.

After that we offer nothing but regrets.

TAVA
U S A I N C.

445 Park Avenue, Brooklyn, N.Y. 11205

© 1985 Tava USA Inc. Nationwide service.

Sprite is a registered trademark of Tava USA Inc. Sprite made in USA.

* Color monitor optional. DEALER INQUIRIES WELCOME.

CIRCLE 499 ON READER SERVICE CARD

Compuclassics

SOFTWARE

DATA BASE MANAGEMENT

ALPHA SOFTWARE	Our Price
Data Base Manager II	178.00
ASHTON TATE	
dBase III	369.00
FOX & GELLER	
QuickCode III	145.00
QuickReport III	145.00
dGraph III	145.00
LEADING EDGE	
Nutshell	79.00
M.D.S.S.	
Knowledge Man/2	299.00
MICROPRO	
InfoStar +	199.00
MICROIM	
rBase 5000	359.00
Extended Report Writer	89.00
MICROSTUF	
InfoScope	125.00
NANTUCKET	
Clipper (dBase III Compiler)	359.00

WORD PROCESSORS

LEADING EDGE	
With Merge & Spell	149.00
LIFETREE	
Volkswriter Deluxe	149.00
MICROPRO	
Wordstar	179.00
Wordstar Propak	249.00
Wordstar 2000	249.00
Wordstar 2000 Plus	295.00
MICROSOFT	
Word	239.00
MULTIMATE	
Multimate	205.00
OVERON	
Overon Omni-reader	639.00
SANNA	
Sanna Word III	249.00
Sanna +	339.00
SATELLITE SOFTWARE	
Word Perfect 4.0	219.00

INTEGRATED SOFTWARE

ALPHA SOFTWARE	
Electric Desk	189.00
ASHTON TATE	
Framework	369.00
LOTUS	
Symphony	439.00
SOFTWARE GROUP	
Enable	339.00

SOFTWARE PUBLISHING

PFS Family	
Write	80.00
File	80.00
Graph	80.00
Access	80.00
Plan	80.00
Report	80.00
Proof	80.00
XANARO	
Ablity	285.00

GRAPHICS

DECISION RESOURCES	
Chartmaster	239.00
Signmaster	175.00
DIGITAL RESEARCH	
Dr Draw	195.00
Gem Draw	95.00
I.M.S.I.	
PC Paintbrush w/ Mouse	129.00
MICROGRAFX	
PC Draw	249.00
MICROPRO	
Chartstar	149.00
MICROSOFT	
Chart	159.00

PROJECT MANAGEMENT

BREAKTHROUGH	
Timeline Version II	255.00
HARVARD SOFTWARE	
Total Project Manager	245.00
MICROSOFT	
Project	159.00
SCITOR	
Project Scheduler Network	339.00
SORCIN/ IUS	
Superproject	229.00

SPREADSHEETS

LOTUS	
Lotus 1-2-3 Version II	329.00
MICROSOFT	
Multipan	219.00
SORCIN/ IUS	
Supercalc II Release 2	189.00

COMMUNICATIONS

HAYES	
Smartcom II	95.00
MICROSTUF	
Crosstalk XVI	99.00
Remote	99.00
Transporter	145.00
WOOLF	
Move-it	95.00

ACCOUNTING

G.H.P.	
C.P.A. +	359.00

Order desk & technical support open:
8 a.m. to 6 p.m. Monday - Friday
10 a.m. to 2 p.m. Saturday

I.U.S.	
All Modules	309.00
Payroll	379.00
Easy Plus	99.00
OPEN SYSTEMS	
All Modules	339.00
Business Basic Interpreter	165.00
REALWORLD	
All Modules	399.00

PROGRAMMING LANGUAGES

BORLAND INTERNATIONAL	
Turbo Pascal 3.0	35.00
With 8087	59.00
With 8087 & BCD	75.00
Turbo Toolbox	30.00
Turbo Tutor	15.00
Graphix Toolbox	30.00
DIGITAL RESEARCH	
C Basic Compiler	369.00
LIFEBAT ASSOCIATES	
Lattice C Compiler	299.00
MICROSOFT	
Fortran Compiler	229.00
Quick BASIC	65.00
Macro Assembler	99.00
C Compiler	249.00

UTILITIES

BORLAND INTERNATIONAL	
Sidekick	30.00
Sidekick (Unprotected)	45.00
Superkey	37.00
CENTRAL POINT	
Copy II PC	29.00
DIGITAL RESEARCH	
Gem Desktop	32.00
FUNK SOFTWARE	
Sideways	35.00
PETER NORTON	
Norton Utilities	55.00
QUAD SOFTWARE	
Zero Disk	CALL
ROSESOFT	
Prokey	89.00
SIMON & SCHUSTER	
Typing Tutor III	32.00
SOFTWARE ARTS	
TK Solver	259.00
UNISON	
Printmaster	32.00
WARNER SOFTWARE	
Desk Organizer	59.00

PERSONAL MANAGEMENT

CONTINENTAL SOFTWARE	
Home Accountant Plus	82.00
LIVING VIDEOTEXT	
ThinkTank	99.00
MECA	
Managing Your Money	185.00
MONDGRAM	
Dollars And Sense	99.00

ADVANTAGES

- We welcome corporate accounts.
- Free technical support.
- Immediate replacement of defective goods.
- Bulk discounts.

HARDWARE

MONITORS

AMOEK	Our Price
Amdek 310A	159.00
PRINCETON GRAPHICS	
Max 12-E	169.00
HX-12	479.00
SR-12	599.00
Scan Outbler	179.00

PRINTERS

EPSON	
FX 80 Plus	309.00
FX 100 Plus	489.00
LD 1500	919.00
NEC	
2250	750.00
OKIDATA	
All Models	CALL
TOSHIBA	
1340	549.00
351	1275.00

MEMORY AND MULTIFUNCTION BOARDS

AST RESEARCH	
Stack Plus w/ 64K	235.00
Adventure w/ 128K	399.00
Megaplug II w/ 64K	285.00
GENOA SYSTEMS	
Spectrum	339.00
HERCULES	
Graphics Board	309.00
Color Card	149.00
PARADISE	
Modular Graphics Card	265.00
Five Pack with 8 K	159.00
QUADRAM	
Quadboard 64K	199.00

MODEMS

HAYES	
1200 B	639.00
1200	399.00
2400	679.00

MISCELLANEOUS

KENNINGTON	
Masterpiece	99.00
KEYTRONICS	
5151 Keyboard	175.00
MICROSOFT	
Mouse	129.00

Call for prices on IBM computer systems and for any item not included in this price list.

1 818 705-1895 US
1 800 231-6603 CA
1 800 328-4473 US



6924 CANBY ST SUITE #118 RESEDA CA 91335

CIRCLE 205 ON READER SERVICE CARD

EXECUTIVE PICTURE SHOW

Business Graphics

Freeform Graphics

Slide Presentations

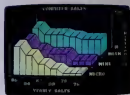
Animated Presentations

10
Minutes After
You've
Completed Your
Presentation . . .

Your Audience
Will Have Forgotten
Half
Of Its
Content . . .

2
Days Later,
They
Will Have Forgotten
Half Of That . . .

**EXECUTIVE
PICTURE SHOW**
Was Designed To Improve
Your Chances Of Leaving
A Long-Lasting Impression.



EXECUTIVE PICTURE SHOW™ combines three graphics tools into a complete presentation graphics system. The business person can now formulate ideas for a presentation and translate those ideas into a complete computer presentation. Use **EXECUTIVE PICTURE SHOW's™** paint capabilities to create pictures from scratch or enhance graphs and images from other programs. Then take those images and use animation to make a point or bring life to your presentation. Finally, you can combine all of these images into a "screen-oriented" slide presentation, right there on your computer!



PAINTING (with Vectored File/Font Creator):

Includes an array of shapes, patterns and colors that can be used to draw and illustrate. Text fonts can be combined with graphics for strong visual impact. All of the standard paint features (plus many more) are here to create graphic images for any application. Use the "screen grabber" feature to make or enhance graphs or text charts for a report, using popular programs like Lotus™ 1-2-3™, pfs®:graph, Wordstar™, or The Art Studio™. Disk libraries of pre-drawn images available separately.

GRAPHING (9 different graph types):

Use **EXECUTIVE PICTURE SHOW's™** standard business graphs and charts to give visual meaning to your business statistics.

PRESENTING (with plotter support):

Take all of the graphic images (even animated sequences) and create a screen presentation where you determine, just like a motion picture or photographic slide show, where to highlight an item, add a pause, combine special effects and transitions, or make a point.

We've incorporated business and free-form graphics into a professional presentation package which allows you to create a sophisticated on-screen "slide show" and leave a lasting impact.

Capture your Lotus™ graphs (or just about any other graphics or text image), enhance them, and incorporate them right into your presentation.

For permanent output, go direct to plotter, color or dot matrix printer, or the Polaroid Palette.™

You know how valuable executive time is. When you have a group's attention, you've got to make the best use of it possible.

SYSTEM REQUIREMENTS

- IBM PC (or equivalent), XT, AT & compatibles
- Two double-sided disk drives
- (hard disk recommended for presentations)
- 192K RAM (256K for compatibles)

CIRCLE 135 ON READER SERVICE CARD

- Color Graphics adapter
- BASICA or equivalent
- DOS 2.0 or higher
- Mouse not required

Spectrum HoloByte Inc.

1050 Walnut, Suite 325, Boulder, CO 80502
For Orders/Inquiries Call 1-800-621-8365 ext. 262



Unleashing the Power Of Microsoft Word

These five books all reveal the secrets of using Word, but "Word Processing Power with Microsoft Word" clearly outshines the others, putting Word's power into the hands of novices and experts alike.

Bestseller *Microsoft Word* is an extremely powerful program that uses concepts, strategies, and a special vocabulary more akin to typesetting than to word processing. Given the program's original documentation and tutorial material (which is significantly improved with Version 2.0), it's surprising that a flood of books explaining the wonders of *Word* haven't hit the bookstores. It's certainly a credit to *Word*'s superb power—especially its ability to format documents for sophisticated output devices such as laser printers—that its users have been dedicated enough to learn *Word*'s features and unique terminology, relying solely on Microsoft's documentation.

Recently, several experienced users have written books that go beyond *Word*'s own documentation and tutorial material. Here are five books, ranging from primers to encyclopedic coverage of *Word*'s power features.

Beginner's Corner

If you are unfamiliar with *Word*, word processing in general, and your IBM PC, Janet Rampa's *Getting Started with Microsoft Word* is the right book for you. Experi-

enced word processing users who are switching to *Word* and looking for a helpful book should look elsewhere.

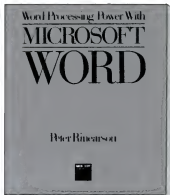
Getting Started with Microsoft Word patiently goes through every step necessary to install *Word* on a floppy disk PC. While the discussion on installation procedures is helpful to beginners, the lack of equivalent information on hard disk systems was frustrating. One section covers

Rampa mentions *Word*'s spelling checker only in passing and insists on doing some things her own way, including consistently misspelling "clicked" as "clikked" and using her own vocabulary in places where *Word*'s own terminology is different and confusing enough. Things could get out of hand the first time a beginner checks the *Word* manual for further information.

Overall, however, this well-written book is effectively organized and well illustrated and will be useful to any beginner who just picked up a copy of *Microsoft Word* along with a new PC.

Let the Class Begin

Paul Hoffman's *Microsoft Word Made Easy* is an excellent textbook for a course on *Word*. The book is efficiently organized and well written and includes exercises that are more than suitable for a classroom laboratory. Self-starters who are familiar with PC and word processing basics can also use Hoffman's book to learn the *Word* program. Of course, you'll need a moderate amount of discipline to stop yourself from looking at the exercise answers before doing them, but the book is evenly paced to give you a comfortable learning



the basics of typing on a computer keyboard, and another section explains formatting, file saving and retrieving, and printing. No time is spent on anything beyond the ken of a rank beginner.

Rampa gives equal time to the controversial subject of using either a mouse or a keyboard to use *Word*'s editing functions. She explains both methods in great detail, carefully illustrating every keystroke, mouse movement, and click.

PC FACT FILE

Getting Started with Microsoft Word

Janet Rampa
Microsoft Press
10700 Northup Way
Bellevue, WA 98009
(206) 828-8080
Copyright: 1984
Cover Price: \$16.95
ISBN: 0-14-087-136-5

CIRCLE 649 ON READER SERVICE CARD

PC FACT FILE

Microsoft Word Made Easy

Paul Hoffman
Osborne McGraw-Hill
2600 Tenth St.
Berkeley, CA 94710
(415) 548-2805
Copyright: 1985
Cover Price: \$15.95
ISBN: 0-88134-144-4

CIRCLE 650 ON READER SERVICE CARD

BOOK REVIEW

track without an instructor's guidance.

Microsoft Word Made Easy includes a handy and complete reference card covering *Word's* numerous commands. The book's only flaw is that it was written for Version 1.15 and is now out of date. This may not be a problem in a classroom environment with an instructor who is familiar with *Word's* latest tricks, but it could be confusing to a beginner on his or her own. I hope McGraw-Hill updates this fine book.

Word Power

Peter Rinearson's *Word Processing Power with Microsoft Word* is a power user's atlas. It contains a myriad of useful road maps, tips, and global strategies that will do everything from teaching an experienced *Word* user new tricks to helping an advanced beginner learn how to easily unleash the power of this program.

Pulitzer prize winner Rinearson's ex-

pository style is easy going and lucid. His journalist's sense of humor pervades topics ranging from helpful file recovery tips to the mouse-editing techniques he disdains. It's a welcome relief from the dry prose that you have to shuffle through in most computer and word processing books. It is also the only book currently available that is up to date with Version 2.0 of the product.

The thoroughness of Rinearson's book is awesome. It is divided into three sec-



Word Processing Power with Microsoft Word

Peter Rinearson
Microsoft Press
10700 Northway Way
Bellevue, WA 98009
(206) 828-8080
Copyright: 1985
Cover Price: \$16.95
ISBN: 0-914845-05-5

CIRCLE 65 ON READER SERVICE CARD

tions: *Learning Word*, *Using Word*, and *Mastering Word*. The first section begins with a user-edition plan that complements the *Word* disk-based tutorial supplied by Microsoft and includes explanations of *Word's* terminology and technology. The Using section gives detailed explanations of formatting and other techniques and features. It includes an extensive explanation of how *Word's* various window and other options alter the screen's display from the format of your final printed document.

The Mastering section is not as extensive as I had hoped it would be. It covers style sheets and mail merge more than adequately but doesn't explain important power tools, such as modifiable printer driver files, and how to use external keyboard macro programs with *Word*. The tips on speed have more to do with how to approach computer applications than how to get more speed out of *Word* (probably be-

DISK MECHANIC

The ULTIMATE Backup, Analyze & Repair Utility
The Disk Toolkit NO IBM PC Should be Without
Protects Your Software Investment

BACKUP TOOLS:

- Can Backup Most Every Diskette
- SUCCEEDS where others fail
- Works Manually or Automatically
- Creates "Protected" Diskettes
- Many Additional Analysis Tools

SECTOR TOOLS:

- Examine/Print Sector Data
- Modify (ZAP) Sector Data
- Compare, Copy & Zero Sectors
- Search Sectors For Data

FILE TOOLS:

- Show Disk & File Allocation
- Display & Alter File Data
- Repair Damaged Disks
- Recover Erased Files
- Alter "Hidden" Status
- Search Files For Data

HACKER TOOLS:

- Modify Floppy Disk Controller
- Paramaters
- Supports All FDC R/W Commands

DISK MECHANIC works with all standard IBM PC disk formats including "protected" diskettes with mixed track and sector sizes, high and low track formatting, CRC errors, and single or double sided drives. DISK MECHANIC requires an IBM PC with 128K of memory or COMPAQ with 192K of memory, DOS 1.1D, and 2 floppy disk drives. DISK MECHANIC includes a detailed 48 page instruction manual. To Order DISK MECHANIC send check or money order for \$76 plus \$3 for shipping (Mass. res. add sales tax). To: MLI MICROSYSTEMS, Box R26, Framingham, Mass. 01701 or Call (617) 826-2055 for Mastercard or VISA orders. Dealer/Distributor inquiries welcome. ©1983 MLI MICROSYSTEMS.

MLI MICROSYSTEMS

CIRCLE 144 ON READER SERVICE CARD

\$6 Software

How could it be any good for only \$6? Many capable programmers have written high quality programs with complete documentation on disk and request a donation from satisfied users. Other program authors just want people to use the programs they have built and found useful. PC-SIG provides a single source of IBM-PC programs for \$6 per disk. Listed below are sets of some of the more popular disks from the library of over 350 disks.

- | | |
|---|--|
| <input type="checkbox"/> 350+page printed Directory \$8.95 | <input type="checkbox"/> Set of 3 Utility Disks \$18
(Disk cataloging program, file modify and restore utilities) |
| <input type="checkbox"/> Set of 5 Introductory Disks and Directory \$36
(includes word processing, long system, utilities, games, and printed directory) | <input type="checkbox"/> Set of 4 Top Game Disks \$24
(Arcade quality games, several on each disk) |
| <input type="checkbox"/> Set of 3 Financial Disks \$18
(Personal general ledger, spreadsheet, stock trading) | <input type="checkbox"/> Set of Two Genealogy Disks \$12 |
| <input type="checkbox"/> Set of 6 Lotus/Symphony Worksheet Disks \$36
(Templates, Tech notes, utilities, macro library) | <input type="checkbox"/> How to Unprotect Popular Software (2 disks) \$12 |
| <input type="checkbox"/> Set of 5 Language Disks \$30
(Assembly with tutorial, Logo, XUSP, Fortran) | <input type="checkbox"/> PC-SIG Directory on Disk (2 disk set) \$12 |
| <input type="checkbox"/> Set of 4 Educational Disks \$24
(Typing tutor, history, BASIC tutorial, math tutor) | <input type="checkbox"/> 1 year PC-SIG membership \$15
(Receive all PC-SIG publications including printed directory, newsletters, and disk discounts) |

Please add \$4 postage and handling to all disk orders, add \$1.50 postage and handling for the Directory only. California residents add state sales tax.

Total Enclosed _____ by ☐ Check ☐ Visa ☐ MC
Card No. _____ Exp. date _____
Day phone _____ Signature _____
Name _____
Company _____
Address _____
City _____ State _____ Zip _____



PC-SIG
1030 E. Duane Ave., Suite J
Sunnyvale, CA 94086
(408) 730-9291

To order, call:
800-235-6646
600-235-6647 (CA only)

CIRCLE 154 ON READER SERVICE CARD

cause it can't be done). Rinearson's method for creating an index seems overcomplicated. All three sections are supplemented by a complete guide and explanation of *Word*'s error messages.

If you're new to *Word*, Rinearson's book will prove to be a long-term friend, and even if you're an experienced *Word* user, you will find something useful on nearly every page. *Word Processing Power* with *Microsoft Word* is the *Word* power user's book of choice—don't miss it.

Rinearson's sense of humor provides relief from the dry stuff of most computer and word processing books.

Mouse Styles

Using *Microsoft Word*, by Claire Chase and Masha Zager, is written for intermediate to advanced users of *Microsoft Word*. The book takes you from starting *Word* for the first time to using some of its more powerful features such as style sheets and mail merge. Unfortunately, a few steps and techniques get left out along the way.

Some *Word* users detest using a mouse, but others consider it to be a power user's ultimate tool. Count Chase and Zager among the latter group, as the electronic rodent fairly scoots across the pages of their book. The mouse dominance is so extensive that the authors barely acknowledge that a *Word* user can do nearly everything with the keyboard instead (the last keyboard reference I could find is on page 36). This approach is acceptable if you want a book to teach you how to use a mouse with *Word*, but in my opinion it's a major flaw that limits the book's appeal.

PC FACT FILE

Using *Microsoft Word*
Claire Chase and Masha Zager
Que Corp.
7999 Knuze Rd.
Indianapolis, IN 46250
(317) 842-7162
Copyright: 1985
Cover Price: \$16.95
ISBN: 0-88022-112-7

CIRCLE 632 ON READER SERVICE CARD

Another good news/bad news item in this book is the way the authors approach formatting. *Word* allows you to format text directly or by using a group of stored formats called style sheets. Chase and Zager

do an excellent job of explaining how to create and use style sheets. Unfortunately, they do not even consider or address the way that you can format without them.

It's too bad this book isn't more bal-

A NEW KIND OF COMPUTER STORE ★ WE DISCOUNT EVERYTHING ★

OKIDATA

OKIDATA 192	349.95
OKIDATA 193	489.95
OKIDATA 64	669.95
OKIMATE 20	229.95

NEC

ELF-360	449.95
3550	999.95
6650	1429.95
HR 15	359.95
HR 25	499.95
SILVER REED 550	399.95

Hayes

2400RS	232.599.95
1200RS	232.389.95
★ 1200 B INTERNAL	359.95
PROMODEM 1200B IBM	269.95
PROMODEM 1200	299.95

BORLAND

INTERNATIONAL SIDEKICK	39.95
SUPER KEY	49.95
SIDEKICK/SUPERKEY	99.95
84.95 AFTER MFG's \$15 REBATE	
TURBO PASCAL	49.95

Print Shop

PRINTMASTER	39.95
ART GALLERY	46.95
MANAGING YOUR \$	34.95
NEWSROOM	109.95
CLIP ART	34.95
CLIP ART	19.95

dBASE

FRAMEWORK	359.95
FRAMEWORK	359.95
COPY II PC	25.95

EPSON

EPSON FX 65	349.95
EPSON FX 165	489.95
EPSON LX 80	249.95
EPSON LQ 1500 (PAR)	995.95

Panasonic

1091	249.95
1092	379.95
TOSHIBA 1340	479.95
TOSHIBA 1351	999.95
TOSHIBA 351	1079.95

Lotus 123

★★ SYMPHONY	299.95
★★ SYMPHONY	409.95
FONTRIX	99.95
FONTPAKS 1 THRU 13 EA.	19.95
GATO	29.95

AST

SIX PAK + 64K w/FREE	
BORLAND SIDEKICK	239.95
64K RAM (9) SET	7.95
256K CHIPS EA.	4.95

MICROSOFT

FLIGHT SIMULATOR	39.95
WORD	239.95
JET	39.95

DOLLARS & SENSE

w/FORECAST	109.95
CROSSTALK XVI	129.95

HERCULES GRAPHICS

HERCULES GRAPHICS	299.95
HERCULES COLOR	159.95

SIDEWAYS

.....	46.95
-------	-------

★ ★ CALL FOR OTHER PRICES ★ ★

BECAUSE HARDWARE AND SOFTWARE PRICES ARE CHANGING SO RAPIDLY, WE URGE YOU TO CALL US FOR OUR VERY LOWEST CURRENT PRICES! WE APPRECIATE YOUR BUSINESS and will do everything we can to make you happy

TERMS: F.O.B. Westminster, CA. We accept VISA, MasterCard, Cash, Money Orders, Checks. Certified Checks are better. Purchase Orders (2% 10-Net 15). Add 2% for bank cards & P.O.'s. Ask about our return policy as we are not responsible for compatibility. Prices are subject to change without notice and without obligation. Subject to stock on hand.

GARDEN OF EDEN

COMPUTERS

ORDERS ONLY

800-762-3227

OUTSIDE CALIFORNIA ONLY

800-331-0045

INSIDE CALIFORNIA

16405 Magnolia, Westminster, CA 92683

1/2 blk. N. of the 405 Freeway

Mon-Fri 10-6:30 Sat 10-5

CLOSED SUNDAYS & TUESDAYS 12/85

**AMT
286**

100% IBM PC AT compatible computer 6MHz or 8MHz (opt), 640KB memory, 8I/O expansion slots, 80287 option, Floppy and Hard disk controller, 1.2MB disk drive, 20MB Hard disk, KB, all for \$1999⁰⁰
Limited offer.

(Suggested retail \$3995⁰⁰)**AMERICAN MICRO TECHNOLOGY****(714) 972-2945**

TWX 5106003265

**IBM PC, XT, AT & COMPATIBLES
at wholesale prices****XT-PLUS**

an IBM PC XT Compatible Computer 640K on Mother Board,
Keyboard, Eight Slots, Floppy
Controller, P/P, S/P, Clock, Game Port, two
Drives only

\$799.

(Suggested Retail Price \$1399.)

640K Ram	each	45
128K Ram	each	3.50
256K Ram	each	2.50
Toshiba Drive 360KB		79.00
1.2 MB Disk Drive for AT		129.00
20MB Hard Drive w/Controller and Cables		449.00
10MB Tape Back Up Drive for XT		299.00
10MB Tape B/U Drive for AT		375.00
135 watt Power Supply		79.00
195 watt Power Supply		125.00
FDC with P/P, S/P, Clock & Game Port		99.00
AT Mother Board		799.00
XT Mother Board		125.00
Floppy/HD Controller for AT		219.00

AMT**(714) 972-2945**

TWX 5106003265

CIRCLE 507 ON READER SERVICE CARD

Ask for our
Free Catalog**hBudgetSM****A HOME AND PERSONAL ACCOUNTING PROGRAM
that means business**

hBUDGET has all accounting functions performed by other home accounting programs, but adds unique capabilities for future planning, budgeting and cash flow projection.

hBUDGET will teach you successful personal accounting techniques, will help you at all times.

hBUDGET is the only program with date-handling capacity that you never outgrow, the only program that lets you access all your records without limitations, year after year.

hBUDGET is written in compiled dBASE III language and has all data processing power of this famous software, but significantly surpasses it in speed. (You don't need dBASE II to run hBUDGET.)

hBUDGET produces standard dBASE II-formatted data files and permits custom processing of data by Lotus 1-2-3, Symphony, dBASE III, etc.

- o Simple, menu-based operation. HELP screens, pop-up menus that can be turned ON or OFF to select a desired level of help. All functions are EASILY user-defined.
- o Create a comprehensive "book of records" and automatically save it up-to-date.
- o Unsurpassed in flexibility. Transactions can be added or modified on any date (on monthly or annual "closing" of accounts).
- o Data entry screens show current account balance and "last check entered".
- o Features an on-line pop-up calculator for easy entry of amounts.
- o Allows "split" transactions (between accounts, expense/income categories, etc.)
- o Provides balances in all accounts, selected subtotals and NET WORTH for any date.
- o Extensive search capabilities - data retrieval by multiple user-defined criteria.
- o Fast balancing of accounts against an account statement.
- o Allows definition and maintenance of a data base of future, planned transactions.
- o Provides a "payment reminder". Automatically displays future, planned transactions as they become due or past due.
- o "Cash flow projector" predicts all account balances for any future date, allows "what-if" studies, monitors "account profile".
- o Monthly budgets by selected expense categories, comparison to actual expenses.
- o Provides security, allows two levels of user-definable privileges.
- o Tracks 33 user-defined accounts, 38 basic expense categories and up to 100,000 expense types. Every amount can be defined as a checking account.
- o Offers dozens types of printed reports.
- o Runs on an IBM PC, XT, AT, 386 PC, COMPAQ and other compatible computers, uses DOS 2.0 or 3.0 operating system and is NOT copy protected.
- o Requires min.385K memory, two floppy drives or a hard disk, a dot-matrix printer.

To receive your own copy, including five program diskettes and a 180-page manual in an IBM style ring binder and slip case, send \$155.00 to: **OAK PARK SOFTWARE, INC.**

P.O. Box 710 Milwaukee, WI 53201-0710

or order by phone: (414) 797-7711

Master Card / Visa, C.O.D., money orders, cash/cr's or personal checks.
Add \$3.00 for shipping and handling. Wisconsin residents add 5% sales tax.

CIRCLE 367 ON READER SERVICE CARD

**UNBELIEVABLE PRICE!
WHOLESALE PRICE TO THE PUBLIC!****100% IBM XT[®] COMPATIBLE***** 1 YEAR WARRANTY ON ALL SYSTEMS *****COMPLETE MONOCHROME SYSTEM, \$965**

2 DRIVES DS/DD, 256 K MONOCHROME
MONITOR, MONOGRAPHIC CARD (HERCULES COMPATIBLE)

FOR OTHER CONFIGURATIONS CALL FOR
BEST PRICES YOU WON'T BELIEVE!

SPECIAL OF THE MONTH!

10 MB HARDISK (SEAGATE W/CONTROLLER)	\$495
20 MB HARDISK (SEAGATE W/CONTROLLER)	\$595
MULTIFUNCTION CARD	\$119

CIRCLE 315 ON READER SERVICE CARD

ATLANTIC COMPUTER SYSTEM (213) 720-1461

2280 S. ATLANTIC BLVD. #F MONTEREY PARK, CA 91754

INSTANT TELECOMMUNICATIONS!

Pop-Up™ DeskSet Plus™ includes Pop-Up TeleComm.™
Now you don't have to leave 1-2-3 to get Dow Jones.™

BOOK REVIEW

anced. What it covers, it covers well, and it even introduces some creative ways to use *Word*, including a nice set of procedures for "boilerplate" documents. I recommend *Using Microsoft Word* if you believe that *Word*'s style sheets are complex, because the book makes them simple, or you want to get the most from a mouse. But be aware that you have to fill in the rest of *Word*'s capabilities for yourself.

Some Word users detest using a mouse, but others consider it to be a power user's ultimate tool. Count Chase and Zager among the latter.

Oh, My Word!

Anne Elizabeth Guthrie's *The Secret Word* is subtitled *A Guide to the Hidden Potential of Microsoft Word*. A more accurate subtitle might be: "Filling in the Holes in Microsoft's Original Documentation for *Word*," because that is this book's only purpose. That's not actually a bad purpose for a book on *Word*, but Guthrie's book does not fill the bill. It is poorly organized, terribly illustrated, and occasionally inaccurate, and it is written in a style that can best be described as "angry."

Guthrie clearly likes *Word* and understands the program well. Some chapters include lucid explanations of advanced features, such as mail merge, but these occasional insights into *Word*'s power don't make up for the book's overall poor quality. Fortunately for most of us, Microsoft has already done the job Guthrie set out to do with the documentation for its latest Version 2.0 of *Word*. If you already have the *Word* manual and tutorial, you don't need to buy *The Secret Word*. ■

PC FACT FILE

The Secret Word

Anne Elizabeth Guthrie
Technology Associates, Inc.
1001 Connecticut Ave., NW, #628
Washington, DC 20036
Copyright: 1985
Cover Price: \$17.95
ISBN: 0-9614335-0-7

CIRCLE 64 ON READER SERVICE CARD

No other desktop package offers so much.
No other communications package is this easy!

	Pop-Up DeskSet Plus	Smart Com II*	Cross Talk XTM*	Sidekick or Spotlight**
Available at a keystroke	YES	No	No	Yes
Allows telecommunications in middle of other applications	YES	No	No	No
Feed text directly from service to an application	YES	No	No	No
Transmit text from your screen or your notes	YES	No	No	No
Automatically uses PBX and/or long distance services	YES	No	No	No
Send and receive text and binary files	YES	Yes	Yes	No
Automatically logs on to service	YES	Yes	Yes	No
Supports Hayes modem 300, 1200 and 2400 baud rates	YES	YES	YES	No
Direct connect at 110 to 9600 baud	YES	YES	YES	No
VT-100/VT-52 terminal emulation	YES	YES	YES	No
Complete set of desk tools	YES	No	No	No

Pop-Up DeskSet Plus includes Pop-Up Word, Calendar, Alarm Clock, Standard and Financial Calculators, DOS Utilities, Second DOS partition, Phone Dialer and TeleComm™ \$129.95.

Turn in your Sidekick or Spotlight and we'll send you Pop-Up DeskSet Plus for \$95

Use our toll-free number to order direct

1-800-44-POP-UP
(1-800-447-6787)

Available through 500 dealers coast-to-coast and 1200 Radio Shack Computer Centers

POPULAR PROGRAMS, INC.

Formerly BellSoft, Inc.
135 Lake Street, Suite 180
Kirkland, WA 98033
(206) 822-7001

System requirements: IBM PC, XT, AT 320 PC or compatible with a Hayes Smartmodem™. Prices are for US only.

Pop-Up DeskSet Plus and TeleComm are trademarks of Popular Programs, Inc. Other trademarks belong to their respective owners.

"Since I got Pop-Up DeskSet Plus, Sidekick has been banished from my hard disk to a dark corner of my Flip-n-File.™"

— Ted Forgeron, PC Tech Journal

Is there an
XEDIT
compatible editor for
your IBM PC?
Yes. **KEDIT**.


- Most XEDIT commands and features
- XEDIT fullscreen layout
- Multiple files
- Spillscreen editing
- Redefinable keys
- Enhanced block operations
- DOS command interface
- And much, much more

Mansfield Software Group
Box 532
Storrs, CT 06268
203-429-8402

\$125 plus \$3 shipping
Demo Version \$10
MC, VISA, COD, PO, check

XEDIT is IBM's powerful fullscreen editor for VM/CMS

CIRCLE 364 ON READER SERVICE CARD

IBM PC 256K, 2 floppies	IBM PC 20 + 20 256K, 1 or 2 floppies 20MB HD & 20MB Backup	IBM XT 10 + 10 256K, 1 or 2 floppies 10MB HD & 10MB Backup		IBM AT 20 + 20 512K, 1 or 2 floppies 20MB HD & 20MB Backup	COMPAQ DESKPRO 10 MB 640K, 1 or 2 floppies	COMPAQ PORTABLE 288 Custom Configurations
IBM PC 10 MB 256K, 1 or 2 floppies	IBM XT 256K, 2 floppies	IBM XT 20 + 20 256K, 1 or 2 floppies 20MB HD & 20MB Backup		IBM AT 30 + 30 512K, 1 or 2 floppies 30MB HD & 30MB Backup	COMPAQ DESKPRO 10 + 10 10MB HD & 10MB Backup	COMPAQ DESKPRO 288 Custom Configurations
IBM PC 20 MB 256K, 1 or 2 floppies	IBM XT 10 MB 256K, 1 or 2 floppies	IBM AT 20 MB 512K, 1 or 2 floppies		IBM AT 40 + 40 512K, 1 or 2 floppies 40MB HD & 40MB Backup	COMPAQ DESKPRO 30 MB Backup Available	IBM XT COMPATIBLE Custom Configurations
IBM PC 30 MB 256K, 1 or 2 floppies	IBM XT 20 MB 256K, 1 or 2 floppies	IBM AT 30 MB 512K, 1 or 2 floppies		COMPAQ PORTABLE 256K, 1 or 2 floppies	COMPAQ DESKPRO 30 MB Backup Available	IBM AT COMPATIBLE Custom Configurations
IBM PC 10 + 10 256K, 1 or 2 floppies 10MB HD & 10MB Backup	IBM XT 30 MB 256K, 1 or 2 floppies	IBM AT 40 MB 512K, 1 or 2 floppies		COMPAQ PORTABLE 10 MB 256K, 1 or 2 floppies	COMPAQ DESKPRO 40 MB Backup Available	IBM COMPATIBLES ARE YOUR LOW COST ALTERNATIVE

★ **PRICE WAR** ★ CALL US **LAST** WITH YOUR BEST QUOTES ★

PRINTERS

[illegible]

FLOPPY/HARD DISKS

CD: MITSUBISHI PANASONIC TANGOR TUNE		
Hot Hit HSD50	REDUCED	\$79
Free Misting Kit with 2 Drivers		
HARD DISKS FOR IBM PC/XT		
10 MB Int'l w/ Controller	REDUCED	\$369
10 MB Ext'l w/ Controller	REDUCED	\$429
20 MB Int'l w/ Controller	REDUCED	\$469
20 MB Ext'l w/ Controller	REDUCED	\$649
33 MB Int'l w/ Controller	REDUCED	\$999
33 MB Ext'l w/ Controller	REDUCED	\$1,199
44 MB Int'l w/ Controller	REDUCED	\$1,349
44 MB Ext'l w/ Controller	REDUCED	\$1,599
MAINFRAME BACKUPS		
MAINSTREAM compatible tape backup 20MB		\$999
MAINSTREAM compatible tape backup 60MB		\$1,799
HARD DISKS BACKUP FOR IBM PC/XT		
20 MB Int'l Ext'l TAPK BACKUP		\$299
20 MB Int'l Ext'l		\$749-\$849
60 MB Int'l Ext'l		\$999-\$1,099
60 MB Int'l Ext'l Disk Backup		\$2,399
TALL GRASS NEW PC/XT FORMATS		
75-25 MB w/ IBM Backup		\$2,299-\$2,399
40-16 MB w/ IBM Backup		\$799-\$899
60-20 MB Tape Backup		\$1,199
Controller: 3142 Camridge (60 MB): 842		
EVEREX Super Tape Backup Int'l		
EVEREX Super Tape Backup Ext'l		\$699
EVEREX Expansion Chassis Full Height		\$799
EVEREX Expansion Chassis Full Height		\$699
INTERNAL HARD DISKS		
20 MB Int'l Ext'l	REDUCED	\$369-\$439
30 MB Int'l Ext'l	REDUCED	\$439-\$499
MAXIMUM BACKUP FOR COMPACT		
RENUOLD Backup Int'l Int'lmg 10 + 30		\$499
Also Stock Available		
RENUOLD Backup for Int'lmg 20 + 20		
RENUOLD Backup Int'l Int'lmg 20 + 20		\$699
POWER SUPPLY 150 Watts		
		\$99

MULTIFUNCTION CARDS

[illegible]

MONITORS

[illegible]

PLAY CARDS

[illegible]

JOBS ETC

0-800-4-A-FLIGHT

HIGHEST

QUALITY!

64K RAM Set	\$7	10 + Sets	\$6	50 +	\$5
128K RAM Set	\$35	10 + Sets	\$33	50 +	\$30
256K RAM Set	\$30	10 + Sets	\$28	50 +	\$25

8087 Maths Co Processor **Best Price**

8087-2 for IBM AT	REDUCED	\$239
ORCHID P-Card w/128K		\$5-49
Latest Version w/640K		\$399
QUADRAM 614SDpre	REDUCED	\$499

MODEMS

SmartTape 128 300/1200 Bd w/PC/AT II	\$195
SmartTape 2124 1200 Bd Ext w/II	\$209
NAYTES 1200 Bw/SmartCard II	\$378
NAYTES 1200 Bw/II Software	\$335
NEWPORT 1200 Bw/II NEWPORT Bd Ext	\$389
NAYTES Transport 1200	REDUCED
HP/PCMC 1-C150 Int w/PS Access	\$589
POP/CM 1-C150 Ext w/PS Access	\$329
ASST Protect 1200 Bd short card w/Crosslink	\$199
PROTECTOR 1200 Bd short card w/Crosslink	\$199
Options Processor	\$70 w/Modem
Alphastream Display	\$19 w/Modem
New Comm Buffer for 1200 Ext	CALL
QUADROM 1200 Bd short card w/Crosslink	CALL
QUADROM 1200 Bd short card w/Crosslink	\$759
1200 Bd Upgrade Kit for Quadrom II	CALL
2400 Bd Half Card w/Crosslink XVI	\$349
2400 Bd Half Card w/II software	\$349
1200CM 1200 Bd w/Modem Ext	\$319
ST/XT XVI	\$289/\$319/\$359
WATSON Integrated Voice Data Modem	CALL
EVEREX 1200B Internal w/Software	\$249

Journal of Management Inquiry 22(1)

SPECIAL ITEMS	
CHRON OMNI READER	
A must for any one using word processing. Works like a scanner transforming text from paper to your computer. Reads common type faces. Will save hours of laborious typing. It is a great technological breakthrough at a very reasonable price. Comes complete with interface and software for your computer.	
IBM TERMINAL 3161	\$499
IBM TERMINAL 3163	CALL
GENERAL Parametric's VideoShow	CALL
CHRONUS PHOTOBASE/PC EYE	CALL

[illegible]

CABLE Riser 5-ft	\$26
Keyboard Extension 5-ft	\$10
Keyboard Extension 7-ft	\$10
GROUND Plug w/ 12in Cable	\$140
Serial Version w/ RJ45	\$180
DUALS 8-in x 10-in	REDUCED \$499
HYDRAFORM 12-in x 20-in	\$499
Mouse System PC Mouse w/ PC Pant	\$129
PC Mouse w/ PC Pambush	\$129
INTEGRITY Mouse w/ PC Pambush	\$129/\$139
Mouse Pad	\$165
KEYBOARD/CB Switch Box	\$165
ARCB/ARCB Switch Box	\$165
COMPUTER ACCESSORIES P + 3	\$179
Mouse Pad w/ 2 Mouse Buttons	\$179
POWER DIRECTOR P-12 w/ 2 Buttons	\$199
KENNINGTON Master Piece Plus	\$300
KENNINGTON Master Piece Plus	\$300
TRUST FWB SUPPLY w/ large protection	\$339
500 Watts	\$339
500 Watts (Size Walnut)	\$339
JAGUAR Monitor 16 in	\$129n \$129n
LITL/SWELL Monitor \$129n	\$129
SUPPLY 130 Watt	\$129
EXPRESS Supply 150 Watts	\$99
PENNER Expansion Cables Half length	\$89



405 C CONSTITUTION AVE CANABUO CARBON

TRUE: ORDERING IN CASE DEPENDS ON SCALAR

Index To Advertisers

RS #	Advertisers	Page	RS #	Advertisers	Page	RS #	Advertisers	Page	RS #	Advertisers	Page
242	A.S. Gibson & Son	84	121	Contemporary		160	Jeden Div of QIC Research	236	374	PCUSA	243
338	Alan, Emerson and Franklin	242		Computer Wear	234	342	K Software House	243	379	PC's Limited	11
357	All Computers	12-13	225	Core International	16	195	Lanier Business Products	101	385	PC's Limited	36-37
234	Allen Harris Industries	269	140	CompuLink	58	196	Lanier Business Products	103	382	Personal Computer	
380	Alps America	76-77	369	Creative Microsales	250	197	Lanier Business Products	105		Products	215
502	American Micro	296		Cams Manufacturing Co.		385	Laticre Software Inc.	206	112	Popular Programs	297
487	Analytics International Inc.	199-77		Inc.	Cover 4	113	Laticre Software Inc.	202	134	Polaris	106
388	Arifino Software	69	148	Bac Software, Inc.	17	334	Light Software	214	489	Portable Computer	301
311	Arlington Computer Products	256	198	David Aldridge Co.	79	202	Logitech	98	*	Pratt & Whitney Engineering	4
100	AST Research, Inc.	142-43	508	Decision Resource	144-145	*	Look-Up Corp.	167	123	Precision Data Products	214
325	Atlantic Computer Systems	296	474	Decision Ware	61	481	MA Systems	86	187	Primavera Systems	70
371	Atomics	303	516	Discount Computer Centers	300	470	Macrocom Inc.	208	199	Princeton Graphics	141
367	Banner Blue	197	109	Discount Microsales	258	485	Magnum Computer	249	188	Programs Plus	53
527	Bay Express Company	273	108	Discount Microsales	209	368	Magnum PC	218	309	Progressive Micro	
112	Beilco	297	244	Desk World	246	337	Main Street Computer Corp.	48-49		Distributors	18-49
118	Bendall Systems	187	352	Display Telecommunications	32	138	Management Information	383	189	Quantum	159
341	Bible Research	244	236	800 Software	52		Source, Inc.	383	*	Quad Software Limited	231
415	Bit Development	83	497	Electro-Comp	200	389	Manfield Software Group	297	361	QMS	169
147	Borland International	141	492	Elech Research	241	230	Maxell	5	235	Quint	56-57
143	Borland International	147	*	Emerald Systems Corp.	186	478	Maynard Electronics	39	493	Quint	19
150	Borland International	93	362	Emulex-Peryst	188	168	MCBS	253	379	Quicksoft	69
520	Borland International	95	331	Enemincs	146	159	MECA	29	127	QIC Research	207
348	BPI Systems	184	364	Enlighten	27	389	Megaphone Corp.	176	169	RealWorld Corporation	1
381	Brightlight Roberts & Co.	222	163	Excess Systems	9	366	Micro Solutions	243	523	Real World Corp.	302
475	Brookland	275	283	Express Systems	234-235	534	Micro-Z Company	243	*	Software	176
343	Buttsworth	196	106	474 Computer	192-193	157	Micrographs	8	470	SIT Corp.	21
118	C-Three Products	185	392	Finet Group	185	*	Microim	72-73	519	Servet Technology	230
479	Canon Computers & Printers	20	105	Ford Software	103	326	Microim, Inc.	36-31	*	Software Inc.	82
213	Canon Computers & Printers	44	247	Fox & Geller	210	*	MicroWay	28	162	Soft Craft Inc.	190
348	Caroline Engineering	212	250	FTG Data Systems	295	159	MicroWay	96	488	Soft Logic Solutions	228
525	Carter	264-265	319	Garden of Eden	295	496	Migret Software	171	529	Software Building Company	85
151	Central Point Software, Inc.	211	177	General Parameters	71	104	Mix	78	530	Software Link, Inc.	85
152	Central Point	213	373	Golf Star Electronics	172	344	MLM Microsystems	294	393	Software Masters	84
122	Clarify Software	248	373	Golfstar Co.	71	293	Mountain Computer	190-191	487	Software Support	190
184	Cosman Technology Corp.	229	377	Graphic Communications	194	332	Microtel	245	*	Software Support	190
228	Compac/Ad	90-91	376	Graphic Communications	195	477	North Edge	18	135	Spectrum Holobyte	292
205	Compucad	290	480	Gulfstream Micro Systems	218	126	Northeastern Software	24-25	517	STB	Cover 3
*	COMPUMAIL	298	260	H&E Computers, Inc.	304	491	North Utilities	213	*	Sysgen Inc.	50
226	Compuserve	107	303	Hammerlab	223	346	North Utilities	246	*	Systems Management Assoc.	247
490	Computer Dynamics	26	145	Hercules Computer	105	406	Northwest Inc.	294	499	Tava	289
322	Computer Graphics	243	163	Hercules Computer	163	387	Oak Park SW	296	328	Tech PC	239
375	Computer Flat	243	146	Hercules Computer	163	383	Oak Park SW	270-271	386	Tecmar Inc.	Cover 2
103	Computer Logic	243	165	Technology	165	249	Parady Systems, Inc.	260-261		see Telamart	
185	Computer Mail Order	74-75	153	Hewlett Packard	174	526	PC America	100	206	Telemart	227
183	Computer Mart	80	484	Hi-Tech Computers & Electronics	233	141	PC Brand	22-23	483	Telesolutions	62
502	Computer Peripherals	160	378	Howard W. Sams	220	339	PC Connection	150-155	323	Texas Computer Systems	2
370	Concepts in Computer Technology	252	327	Howarth Corp.	102	194	PC Connection	156	324	Texas Computer Systems	3
175	Connecticut Software	237	207	IBM Corp.	106-107	194	PC Horizons	176	510	Verbatim	42
125	Conroy-La Pointe, Inc.	45	494	Intertec Software	243	207	PC Network	68	360	Wilson Associates	261
			*	James River Group, The	251	154	PC Network	64-67	*	Warehouse Data Products	60
							PC Software Interest Group	294	*	XyQuest, Inc.	201

PC MAGAZINE ADVERTISING SALES STAFF

Eugene Duncan - Advertising Director
 Pauline Scherer - Advertising Sales Manager/Telemarketing
 Miriam Hernandez - Assistant to the Advertising Director
 Advertising Coordinators: . . . Robert Simpson, Jeanne Woodcock
 1 Park Avenue, New York, NY 10016 (212) 503-5100

MA, NH, VT, ME, RI, CT
 Kathy Krochta - District Manager
 160 State Street
 Boston, MA 02109
 (617) 367-7190
 John Bucknaway - Account Representative
 (212) 503-5100
 SE, NJ, DE, MD, DC, VA, WV, NC,
 SC, AL, MS, TN, AR, KY, PA, GA
 Bob Ostrow - District Manager
 1 Park Avenue
 New York, NY 10016
 (212) 503-5308
 Lauren Moore - Account Representative
 (212) 503-5100
 NY, NJ, FL
 Eileen Robinson - District Manager

1 Park Avenue
 New York, NY 10016
 (212) 503-5307
 Joel Zuckerman - Account Representative
 (212) 503-5100
 NE, WI, IL, IN, MN, MO,
 OH, MI, IA, ND, SD, Canada
 John Henrich - District Manager
 180 N. Michigan Avenue Suite 1400
 Chicago, IL 60601
 (312) 346-2600
 Michael Tajanjanin - Account
 Representative
 (212) 503-5100
 Jeff Miller - Western Advertising Manager
 CA (San Francisco & North), OR, WA
 Lower Keyler - District Manager

11 Davis Drive
 Belmont, CA 94002
 (415) 598-2341
 Janet Bell - Account Representative
 (212) 503-5100
 CA (Santa Barbara to So. San
 Francisco), CO, ID, MT, AK, NV
 Jeff Cohen - District Manager
 11 Davis Drive
 Belmont, CA 94002
 (415) 598-2341
 Jane Anderson - Account Representative
 (212) 503-5100
 CA (Orange County), AZ
 Page Goodrich - District Manager
 1601 Dove Street
 Newport Beach, CA 92660

(714) 476-0749
 Stan Johnson - Account Representative
 (212) 503-5100
 CA (Los Angeles & San Diego), HI
 Steve Lincoln - District Manager
 3460 Wilshire Blvd
 Los Angeles, CA 90010
 (213) 387-2100
 Joanne Bravine - Account Representative
 (212) 503-5100
 TX, OK, LA, KS, UT, NM
 Jennifer Burdell - District Manager
 9956 Spring Lane
 Dallas, TX 75225 (214) 691-6934
 Joanne Bravine - Account Representative
 (212) 503-5100

**FAST DELIVERY
COAST TO COAST
AIR EXPRESS RUSH**



**TOLL FREE
ORDERS ONLY!**
(INSIDE CALIFORNIA)

**800-631-0962
800-521-6162**

GUARANTEED LOWEST PRICES!

**OUR PRICE GUARANTEE -
It's Simple! We'll beat any ad in
this magazine - same terms -
call TOLL FREE for details!**

**DCC WILL BEAT
ANY PRICE
IN THIS MAGAZINE**

**Customer Service
HOTLINE
(408) 374-4903**

OUR CUSTOMER SATISFACTION GUARANTEE: If for any reason your DCC purchase fails to meet manufacturer specifications within 30 days of purchase, please return it to us for a full refund or exchange of your choice. Sorry, software excluded due to copyright laws.

EPSON See list below:
RX17 and LX1700
also NEW J201
(Toll-free)

ALL MODELS REDUCED

OKIDATA

models
63/63/94
and 63/93/94
also 2410 (2400/94)

IBM PC \$1575 2 drvs 256K
or 3 drives/256K,
16 mg hard disk

IBM XT \$2795
10 mg. hard disk
256K, 1-360KB drive only

new model!! **HR-15 XL \$349**
BROTHER
"LETTER QUALITY"
High Speed 36 cps
7x Buffer **HR-35**

COMPUTERS

IBM PC 1 XT	See special order
PC with 1 drive/540K	1499
PC with 2 drives/256K	1575
XT with 16 mg HD/256K	2795
XT with 2 drives/1080K	2999

Call for details - Complete list below!

Now in Stock

MONITORS

IBM MONOCHROME	249
COLOR	599
AMCR 2095	135
3094	145
3164	145
COLOR 580	419
COLOR 710 NEW	419
TAXI 12" Green	114
12" Amber	117
480 RGB	169
PRINCETON 102-12	499
50-12	169
50-12	169
2500 122-12" G	63
12" A	63
124 MONO - IBM	379
135 RGB-COMP	475
POLO 16 COLOR RGB	399

MODEMS

HAYES 300	199
1200	459
1200B IBM INTERNAL	399
TECHNICAL P.E.	299

PRINTERS

EPSON RX 80 100 cps	299
1380 120 cps new	249
RX 100 120 cps 120 cpi	399
FX 60 or 80	best price
FX 100 120 cps 120 cpi	499
OKIDATA 824/94	Save
102 Pin	49
105 New	Models
2410	Drastically Reduced
OKIDATA 824/94	229
STAR BRUSH 8210	249
STAR 8100	379
JUNO 8200	399

DRIVES

20 MG Internal	\$849
HARD DISK	
*** SPECIAL ***	
\$545	10 MG W/C&C Controller



DISKETTES
5.25/3.5 & DS/DD
79¢ each
"1 YR. Guarantee"



WORDSTAR
2000
All necessary to use
Windows
Features
Spell Checker
Mail, much more
\$259

IBM - BOARDS

HERCULES GRAPHICS	399
HERCULES COLOR New	199
AST 32 PAGE W/4K	299
MEGALUX	299
STARS GRAPHICS PLUS	299
EVEREX GRAPHIC EDGE	279
800 CONTROLLER	299
800 CONTROLLER	299
MAGIC CARD	199
QUADRAM QUADBOARD W/4K	449
QUADRAM	399
IBM MONOCHROME	249
COLOR GRAPHICS	279
PLATINUMS COLOR PLUS	279
TECHNICAL GRAPHICS MASTER	279
PARADISE COLOR	279

IBM ACCESSORIES

540 RAM	19
256K chips	19
VERATIME 100 MB	15/24
STARS 5.25/5	24/29
KEYTECHICS 5.25	174
JEVETEC 5.25/5	159
PRINTER SWITCH BOX	89
COMPARISON PRINT	95
8-1/4 POWER DIRECTOR	549

IBM SOFTWARE

FRAMEWORK Month Special	395
MANAGING YOUR MONEY	199
SUPERFAX	129
MULTIPLAN	129

"IBM WORDPROCESSORS"

WORD PERFECT	249
PIF WRITE	84
MULTIMATE	249
WORD W/WORD	249
WORDMASTER DELUXE	139
PIF PROOF	139
"IBM DATA BASE"	
ORANGE II	249
ORANGE II	249
PIF FILE	84
MAGIC CARD	199
CONCORD II	249
R-BASE 4000/5000	279/399
R-BASE CLOUD	129
"IBM MISC"	
HOME ACT II PLUS	349
BPI GENERAL ACCT	349
DELLATE & BERLE	129
REWARD T&I PREP	89
SERVICES	39
COPY & PC	39
TRAVELMAN	79
PROKEY 3.0	79
HARDWARE PROJECT MGR	39
SOFWATS	45
NORTON UTILITIES	45
PIF REPORT	79
DOE JONES ANALYST	479
SET FX	4
"IBM GAMES"	
FLIGHT SIMULATOR	39
FINSLAL	39
MATHS MASTER	45
FRODOEN	39
OLIMPA II	39
GAZON	39
GATO SUB SIMULATOR	39

**HUNDREDS OF ITEMS
IN STOCK - CALL!!**

**O.E.M. SPEC
IBM DRIVES
SPECIAL \$99**

**AST \$229
SIX PAK PLUS
W/54K \$249
RAM**

**20 MG Internal
HARD DISK
*** SPECIAL ***
\$545 10 MG W/C&C Controller**

WORDSTAR
2000
All necessary to use
Windows
Features
Spell Checker
Mail, much more
\$259

\$124 Mouse systems
2-button
w/PC PAINT
MOUSE
3-button
version only \$140

FREE - VISA/MC!

DCC DISCOUNT COMPUTER CENTERS

an established mail order/retail distribution network

BUYER FRIENDLY TERMS & DELIVERY We ship immediately! Most orders delivered within 5 days! Add 3% (15¢ min) for UPS shipping, handling, insurance. Call residents add 7.0% sales tax 21 day UPS delivery at extra charge. *PAYMENT VISA, MC, cashiers checks, money orders, personal checks accepted (Allow 10 business days for personal company checks to clear). WE NEVER CHARGE EXTRA FOR CREDIT CARDS! C.O.D.'s welcome (10% p.p. discount) with cash, confirmed check or money order. *WARRANTY All items shipped are new, include FACTORY WARRANTY and are GUARANTEED TO WORK. DCC is an AUTHORIZED DEALER and SERVICE CENTER for most major brands. *RETURNING Must be accompanied by RMA number (supplied by DEALER) and may be subject to a 20% restocking fee. Prices and availability subject to change without notice. All items limited to stock on hand. *MAIL ORDER PRICES NOT VALID AT RETAIL OUTLETS DUE TO REGIONAL PRICING RESTRICTIONS. Minimum order \$20.

Mail Checks, P.O.'s and Inquires to:
**DCC MAIL ORDER MANAGER
550 DIVISION ST.
CAMPBELL, CA 95008**

**1707 S. BASCOM AVE. • CAMPBELL, CA 95008 • (408) 559-6555
717 E. EL CAMINO • SUNNYVALE, CA 94087 • (408) 773-8821
1341 FULTON AVE. • SACRAMENTO, CA 95825 • (916) 971-3503**

VISIT OUR DISCOUNT SHOWROOMS!

CIRCLE 516 ON READER SERVICE CARD

Cuts disk access time in half Makes Your IBM PC **LIGHTNING** Fast! \$49⁹⁵

for copy protected version
\$89.95 for unprotected

Loads with the DOS — always ready as a background program (like Sidekick) to accelerate every disk access. You do nothing — everything is automatic.

You are going to be so amazed when you start to work with **LIGHTNING** installed. Every program that accesses the disk (hard disk or floppy) is made instantly faster — 2 to 4 times faster.

It is so easy to install and you never

Any disk intensive program (like a database) runs 2 to 4 times faster.

have to do anything again; it does it all for you — like lightning.

LIGHTNING comes to you on a diskette. You simply load it onto your DOS diskette if you are using floppies, or if you have a hard disk, into the DOS area. Simple A-B-C instructions let you get it started the first time in five minutes. Then it is always ready, working automatically in the background any time you boot up.

What's it like to use it? If you have ever worked with or seen a RAM Disk you know what a difference speed can make when working with any program that accesses the disk. Well,

LIGHTNING enables any program to approach the same rapid speed as a RAM Disk, but it does it without the disadvantages. With a RAM Disk there is a constant danger that you can lose your precious data if you forget to copy it back to the disk drive. With **LIGHTNING** you just use your programs normally. You don't have to remember anything.

LIGHTNING has a fun feature that shows you just how fast you're operating. Any time you want, with a couple of keystrokes you can see a screen that keeps a record of how many times you've accessed the disk, and how much time **LIGHTNING** has saved you. It's fun to check it out, and it's always astounding.

When you work with a database program or most word processors, or any time you need to frequently load files into RAM or save them back, you are accessing your disk. It is such a pleasure to cut those times in half and often to one-fourth.

Spreadsheets will speed up their loading and saving, recalculation is not affected.

Another plus — **LIGHTNING** fully exploits Above Board™ memory for PCs with that addition.

If you have an IBM PC or clone and don't have LIGHTNING, we simply have done a poor job explaining it to you.

PCSG since early 1983 has dominated the lap portable market with ROM software such as Lucid spreadsheet and Write ROM that reviewers rated as excellent. We are proud to enter the IBM PC market with **LIGHTNING**. It's a great product that we not only enjoy offering, but enjoy using on our own PCs. It will support IBM PC, XT, and AT.

This is an exciting program. A typical comment from everybody who uses **LIGHTNING** is "I don't know how I ever did without it."

PCSG provides hotline support for the IBM PC.

(214) 351-0564

PERSONAL COMPUTER SUPPORT GROUP

11035 Harry Hines Blvd., #206, Dallas, TX 75229

MC, Visa, American Express, Check, or C.O.D.

© PCSG

LIGHTNING™ PCSG 1986
Sidekick™ Borland Int.
Above Board™ Intel Corp.



A man, his dog, his pipe, and Volkswriter 3...

ir·ref·ra·ga·bly yours

You may never have to spell *irrefragably*, but with Volkswriter 3 you'd spell it (and 170,000 other words) correctly. That's twice as many words as most other word processors can offer. Our best Volkswriter ever lets you spell, hyphenate, sort, and calculate effortlessly and naturally.

When you want to check your spelling, a simple keystroke flags your mistakes and gives you alternative spellings. Abbreviations, acronyms, capitalizations, cities and common business names are included, and you can create a personal dictionary. We even hyphenate for you automatically. Forgive our *rodomontade*, but Volkswriter 3 can help you perfect your syntagmal

When you need to calculate, Volkswriter 3's advanced math features are ready, like a *mini-spreadsheet* at your fingertips. You can produce

expense reports and budgets, use constants and percentages and subtotals and ... well, just about anything arithmetical from the household to the board room.

You'll find Volkswriter 3 rich in extra features, too. You control the appearance of your copy with a wide range of layout options. Use it with over 200 best-selling printers; send personalized mailings and sort lists; use data from other popular programs, including WordStar® and IBM® DCA files. It runs on the entire IBM-PC family and is the perfect alternative to the more cumbersome MultiMate™ and DisplayWrite™3.

Now you can have *irrefragably* accurate words and numbers with Volkswriter 3. The price, by the way, hasn't changed: \$295. Enjoy the experience today. It will put you on top of the world!

Call us for upgrade information

DICTIONARY

irrefragably, *adv.*, Undeniably
rodomontade, *n.*, Boasting, bragging
syntagma, *n.*, Word or phrase forming
a syntactic unit

INTRODUCING
volkswriter.3
Ask your dealer for a demonstration today



411 Pacific Street
Monterey, CA 93940
(408) 373-4718

TRADEMARKS—Volkswriter and the Lifetree Logo Lifetree Software, Inc. • WordStar/MicroPro International • IBM and DisplayWrite International Business Machines Corp. • MultiMate/Multiwrite International.

CIRCLE 385 ON READER SERVICE CARD



Coming Up

Best of 1985

In honor of ringing out the old and bringing in the new, *PC Magazine* takes one last look at 1985. We asked our editors and writers to nominate the most outstanding products of the year. The Best of 1985 is a purely subjective collection of favorites, including a few of the more notable bombs and worst ideas that 1985 produced.

Enlarging the Dimensions of Memory

In the bad old days when your IBM PC programs bumped their heads against the 640K-byte memory ceiling, there wasn't much you could do about it. Now there are two separate methods of breaking that memory barrier—expanded memory and extended memory. Expanded memory, a simple, short-term solution, gives your PC or XT as much as 8 megabytes of addressable memory. Extended memory, a long-term solution based on the evolving architecture of Intel's processors, adds a potential 15 megabytes to an AT or compatible that uses the 80286 but has a very limited use in the present DOS environment. Confused? Charles Petzold, Phil Wiswell, and Winn L. Rosch explain the difference, offer a quick decision guide, and review 12 extended and expanded memory boards on the market today.

Replacement Keyboards

Neither mice nor light pens have been able to banish the perennial problem of how to key in hours of work faster and more easily. Winn L. Rosch looks at three new keyboards that attempt to diminish strain and fatigue through innovative new designs. The Wico SmartBoard incorporates a trackball, the KeyTronic KB 5153 adds a touchpad, and the Maltron uses a startling layout.

Is There Intelligent Life in the PC?

Many manufacturers are now boasting that their software programs for the PC exhibit artificial intelligence. Are these claims true, or are the programs just examples of clever, brute-force programming, which succeeds by dint of rapid searches through mountains of data, rather than intelligent decision making? Jeff Rothfeder reports on artificial intelligence for the PC and the state of expert-systems research today.

Creating Corporate Training Courseware

Authoring programs can help you create a PC-based software tutorial or interactive course without extensive programming knowledge. The VASCO Concurrent Authoring System lets you run the application you're teaching along with the tutorial. McGraw-Hill's Interactive Authoring System can create sophisticated branching scenarios, quality graphs, and multiple-choice tests.

The Wireless Modem

Although it doesn't have a wide range like conventional modems, the ESTeem Model 84 Wireless Modem offers some interesting alternatives for communications. In fact, the ESTeem can be used for a local area network. M. David Stone, *PC Magazine's* communications expert, evaluates this wireless wonder.

ATronics Delivers AT Compatible System Boards!

ATI-1000-6 6MHz System Board

- 640 Kbytes Main Memory Expandable to 1 Mega Byte

ATI-1000-6 8MHz System Board

- 80286 Processor Standard
- 8 I/O Expansion Slots—
- Socket for 80287 Math Co-Processor
- CMOS Clock Calendar with Battery Back Up Holder
- Board Size 12" x 13.7" Fits Standard AT Case
- Full 1 Year Warranty

New! ATI-2000 8 MHz System Board

- Features Dual Speed 8MHz/16MHz selected by Software Switch
- ZERO WAIT STATE! 8MHz Mode Runs 87% Faster than IBM AT[®]. Based on Norton Sys Info Rating of 8.2

New! ATI Enhanced Graphics Adapter

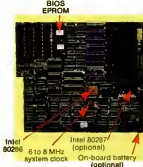
- Features 256 Kbytes Video Memory
- 16 Colors 640 x 360 resolution
- Fully Compatible with IBM EGA Card

Accessories For The AT[®] System Unit Price

- AT Meter AT Style Case 129.00
- AT[®] Low Profile Keyboard 129.00
- 165 Watt Power Supply 179.00
- Combination Hard Disk/Floppy 279.00

Controller Card

AT[®] is a registered trademark of International Business Machines



Complete Evaluation Systems
Available for Immediate
Delivery to Qualified Accounts.

Dealers - OEM - Corporate Accounts -
Call For Quantity Pricing.
(408) 943-6629

ATronics International, Inc.
491 Valley Way Milpitas, CA 95035

CIRCLE 371 ON READER SERVICE CARD



Symphony™

**SOFTWARE PRICED FOR
CORPORATE BUYERS - ALSO
AVAILABLE TO END USERS**

**READY-TO-RUN APPLICATIONS
PACKAGES FOR LOTUS® 1-2-3™
AND SYMPHONY™**

THE COMPLETE BUSINESS PAC

The Complete Business Pac includes all five essential modules below. Each module is complete, concise and suitable for most small businesses.

- GENERAL LEDGER
- PAYROLL
- ACCOUNTS RECEIVABLE
- ACCOUNTS PAYABLE
- INVENTORY CONTROL

The Complete Business Pac \$99.95

STOCK PAC

The Stock Pac provides all major functions for the evaluation, selection and management of investment portfolios.

- PORTFOLIO VALUATION
- BOND CALCULATIONS
- FUTURE PRICE PROJECTIONS
- FINANCIAL RATIOS
- STOCK MARKET ANALYSIS
- CASH MARKET FORECASTING

Stock Pac \$99.95

BUDGET ANALYSIS PAC

The Budget Analysis Pac is for accountants, investors and small businesses that want to present professional statements to their clients, stockholders or their investors.

- BALANCE SHEET PREPARATION
- COMPARATIVE INCOME STATEMENTS
- FINANCIAL RATIOS
- CASH FLOW ANALYSIS

Budget Analysis Pac \$99.95

PERSONAL/BUSINESS PAC

The Personal/Business Pac includes essential functions for a small business or for home and personal use.

- CHECK REGISTER CONTROL
- TELEPHONE DIRECTORY
- MAILING LIST MANAGER
- THE BUSINESS/HOME ACCOUNTANT
- CREDIT CARD MANAGER
- BANK ACCOUNT MANAGER

Personal/Business Pac \$99.95

LOAN APPLICATION PAC

The Loan Application Pac figures all interest, mortgage and savings calculations and gives the user professional reports.

- LOAN AMORTIZATION SCHEDULE
- MORTGAGE/REAL ESTATE CALCULATION
- CASH FLOW ANALYSIS
- PRESENT/FUTURE PAYMENT
- INVESTMENT ANALYSIS
- LEASING

Loan Application Pac \$99.95

DEPRECIATION PAC

The Depreciation Pac performs all standard IRS-accepted depreciation calculations and prints professional looking reports.

- DEPRECIATION/ACCELERATED COST RECOVERY SYSTEM
- STRAIGHT LINE DEPRECIATION
- SUM OF THE YEARS DIGITS
- DOUBLE DECLINING BALANCE

Depreciation Pac \$99.95

COMPUTERONICS

50 N. PASCACK RD., SPRING VALLEY, N.Y. 10977

TOLL FREE ORDER LINE

(800) 431-2818

24 HOUR ORDER LINE

(914) 425-1535

ADD \$3 for shipping in UPS Areas
ADD \$4 for C.O.D. or Non-UPS Areas
ADD \$5 to CANADA or MEXICO
Add proper postage elsewhere

ALL PRICES AND SPECIFICATIONS SUBJECT TO CHANGE - DELIVERY SUBJECT TO AVAILABILITY

Each of these Lotus 1-2-3/Symphony add-on packages comes on an un-protected diskette. The user may modify any add-on package for his own needs. Each package can be used with or without a printer. When used with a printer, the user is provided with professional looking printouts which can be customized to meet the needs of the user. A manual accompanies each package.

1-2-3 and Symphony are trademarks of Lotus Development Corp.
Lotus® is a registered trademark of Lotus Development Corp.

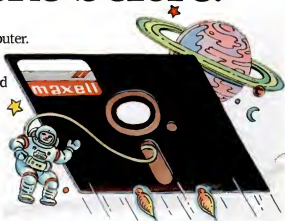


Maxell Gold.

The floppy disk that
packs more facts
into Compaq,
sets HP free,
and takes IBM
Portable where it's
never gone before.

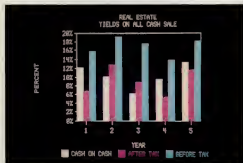
It's great to have a portable computer. Especially when your data stays put. For error-free performance at home or abroad, trust Maxell. The Gold Standard in floppy disks. There's a Maxell disk for virtually every computer made. Each is backed by a lifetime warranty. Maxell. Accepted everywhere, without reservation.

maxell.
IT'S WORTH IT.



If You Use 1-2-3, You Ne

Make Lotus Graphs



Look Like This



**A Keystroke Away,
The Grafix Partner
Enhances Any
Graphic Created
By Other Programs...**

GRAFIX PARTNER
*The Graphics Enhancement
Utility That Sits In Background*

**It's always there, ready to pop-up
behind 1-2-3 or any spreadsheet with
graphics or any other graphics program.**

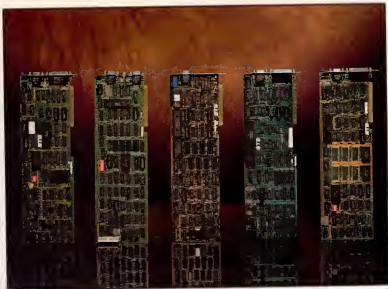
Use **Zoom**, **Undo**, make a slide show
with **Cycle**, change colors, use patterns, **Paint**,
Repaint, **Draw**, add **Text** using any of 20 **Fonts**
provided, add logos, **Transfer** art and logos,
Erase, cut & paste, highlight, airbrush, rubber-
stamp, and more.

Other Business Graphics



Can Look Like This





The Collection

STB

STB's Video Collection

Five Distinctive Choices for Improving Your Computer's Image

At STB, we've created an exciting collection of video boards to expand the display capability of the IBM PC/XT/AT[™] and compatibles. Whether you're looking for high resolution color graphics or crisp monochrome text, STB's video collection offers you more choices than any other manufacturer for improving your system's display.

The Chauffeur — The video board you've been waiting for. Automatically displays color graphics software on monochrome monitors, without inconvenient drivers or preboot software. Full-screen graphics in 16 shades of gray. The easiest to use video board on the market today.

Graphix Plus II — With this board, you don't have to choose between color and

monochrome monitors. Connect both to your computer and the Graphix Plus II automatically switches the display to the appropriate monitor. For producing full-screen monochrome or 16 color graphics, we provide support for Lotus 1-2-3,[™] Symphony,[™] Framework[™] **Super Res 400** — Now you can display clear, monochrome quality text in color and still enjoy superior

graphics. High resolution display of Lotus 1-2-3 and Symphony is made easy with the software support we include. Super Res 400 designed for use with high resolution color monitors.

Color XVI — A less expensive, IBM compatible color board for your standard RGB and composite B&W monitors. You get high resolution display of Lotus 1-2-3, Symphony and Framework as well as the

parallel printer port that IBM forgot.

Mono Plus — No other board can match the clear, crisp, easy-to-read monochrome text produced by the Mono Plus. Features 80 characters x 25 line high resolution text

Every board in our video collection is backed by STB's one year warranty and includes our exclusive PC Accelerator[™] software for print buffering, high speed disk emulation and quick start features. The Chauffeur, Graphix Plus II, Color XVI and Mono Plus offer a standard parallel port and an optional clock/calendar. For more information about these and other STB products write or call STB Systems, Inc., 601 N. Glenville, Richardson, Texas 75081. (214) 234-8750.

IBM, IBM PC, XT and AT registered trademarks of International Business Machines Corp. Lotus, Lotus 1-2-3 trademarks of Lotus Development Corp. Symphony trademark of Ashton-Tate. PC Accelerator trademark of RiscCorp. Chauffeur, Graphix Plus II, Super Res 400, Color XVI, Mono Plus trademarks of STB Systems, Inc. © 1985 STB Systems, Inc.

Simply The Best

STB
STB Systems, Inc.

CIRCLE 517 ON READER SERVICE CARD

CURTIS



Crystal Power Conditioner:
150 or 300 Watt Models.
Retail: \$179.95 and \$239.95



**IBM PCAT
System Stand:** Retail: \$49.95



Portable Pedestal:
For Compaq and IBM
Portables, Retail: \$64.95



**Command
Center:** Controls
Up to 5 Peripherals.
Retail: \$179.95



PC Pedestal: For IBM PC Monochrome
and Color Displays. Retail: \$49.95



IBM, PC, PCXT System Stand:
Retail: \$24.95



Universal Base: For Flat Monitors.
Retail: \$49.95



Extension Cable Sets: For IBM PC Displays
and Keyboards. Retail: \$39.95 - \$57.95



**Serial Modem
Cable:**
Retail: \$29.95

**Parallel
Printer Cable:**
Retail: \$29.95



**Safe-Strip
Surge Protector:**
Retail: \$29.95



Static Mat:
Dissipates Static Discharge. Retail: \$39.95



Curtis Surge Protection: EMI-RF Filtering
Available. Retail: \$49.95 - \$59.95

Twelve Easy Pieces

Whether you need to get more comfortable, want guaranteed protection for your hardware and software, or need a system layout that's personalized to your requirements, Curtis makes it easy. After all, we're Curtis—the experts in accessories.

Curtis products are available nationally from leading Dealers, Distributors, and Retail Chains. In Canada: Micro-Computer Products, P.O. Box 235, Ajax, ONT, Canada L1S 3C3, (416) 427-6612

For the Curtis dealer nearest you call (603) 924-3823

Manufacturing Company, Inc.

CURTIS

305 Union Street, Peterborough, NH 03458